



MARSHALL
REMEMBERS APOLLO

1
00:00:01,130 --> 00:00:15,670

[Music]

2
00:00:21,380 --> 00:00:18,769

well I was at the Air Force armament

3
00:00:24,319 --> 00:00:21,390

center at Eglin Air Force Base after

4
00:00:32,450 --> 00:00:24,329

having gotten out of the Air Force and a

5
00:00:34,960 --> 00:00:32,460

colleague of mine was coming up in 1957

6
00:00:39,200 --> 00:00:34,970

they were going to be hiring people of

7
00:00:42,950 --> 00:00:39,210

starting ABMA and he asked me he wanted

8
00:00:46,160 --> 00:00:42,960

to take my 457 with him and I said no

9
00:00:48,680 --> 00:00:46,170

and I'm happy where I am at the r-mo

10
00:00:51,530 --> 00:00:48,690

Center I'm not worried let me take it so

11
00:00:55,609 --> 00:00:51,540

he did and about three days later I got

12
00:00:58,160 --> 00:00:55,619

a call from a girl in first now and she

13
00:00:59,840 --> 00:00:58,170

says would you be available to come up

14

00:01:02,810 --> 00:00:59,850

for an interview one of the Germans

15

00:01:04,969 --> 00:01:02,820

would like to speak with you and I said

16

00:01:07,310 --> 00:01:04,979

well I said I've never been the

17

00:01:09,740 --> 00:01:07,320

Huntsville and I said I don't want to

18

00:01:13,160 --> 00:01:09,750

sound you know Silva says I think that

19

00:01:16,310 --> 00:01:13,170

we take care of the travel expenses and

20

00:01:19,640 --> 00:01:16,320

everything Oh anything you need whatever

21

00:01:21,050 --> 00:01:19,650

you require we'll take care of it German

22

00:01:24,020 --> 00:01:21,060

that wanted to speak with me with

23

00:01:26,540 --> 00:01:24,030

Gerhardt rice each okay done Tracy about

24

00:01:29,300 --> 00:01:26,550

three days later I got a call from that

25

00:01:30,800 --> 00:01:29,310

same girl in personnel and she says dr.

26
00:01:34,640 --> 00:01:30,810
Isaacs would like to know when you'd be

27
00:01:37,070 --> 00:01:34,650
available to come up and join him I said

28
00:01:40,679 --> 00:01:37,080
well it's gonna be about a month I've

29
00:01:44,700 --> 00:01:42,030
there's more than burning any bridges

30
00:01:47,190 --> 00:01:44,710
behind me to be honest with you so she

31
00:01:50,539 --> 00:01:47,200
said he said that'll be just fine so

32
00:01:55,980 --> 00:01:50,549
that's how I ended up coming up on

33
00:01:58,560 --> 00:01:55,990
January the 31st of 1958 and that's the

34
00:02:01,230 --> 00:01:58,570
day Explorer one went into orbit by the

35
00:02:04,529 --> 00:02:01,240
way I found out later why he was

36
00:02:06,480 --> 00:02:04,539
interested in me joining him Gerhart had

37
00:02:08,809 --> 00:02:06,490
been trying to get some stuff done at

38
00:02:12,780 --> 00:02:08,819

the Cape at the range down there

39

00:02:14,729 --> 00:02:12,790

actually to fire some small rockets is

40

00:02:17,400 --> 00:02:14,739

what he was doing there they were

41

00:02:20,040 --> 00:02:17,410

already working on the Saturn before it

42

00:02:23,550 --> 00:02:20,050

became the Saturn and this was to get

43

00:02:26,550 --> 00:02:23,560

some wind shear and many conditions up

44

00:02:30,360 --> 00:02:26,560

at stage separation on the second stage

45

00:02:33,809 --> 00:02:30,370

and the third stage at that level and he

46

00:02:35,970 --> 00:02:33,819

was having difficulty communicating they

47

00:02:39,539 --> 00:02:35,980

didn't understand him and he did not

48

00:02:41,960 --> 00:02:39,549

understand them and he figured because I

49

00:02:44,610 --> 00:02:41,970

was coming from an Air Force range I

50

00:02:47,970 --> 00:02:44,620

would know how another Air Force range

51
00:02:49,530 --> 00:02:47,980
operated and fundamentally he was

52
00:02:51,720 --> 00:02:49,540
correct I didn't know how a range

53
00:02:55,620 --> 00:02:51,730
operated that spend time with it

54
00:03:00,300 --> 00:02:55,630
the army was too prevalent that to keep

55
00:03:02,190 --> 00:03:00,310
a good bit and the lead engineer for

56
00:03:05,960 --> 00:03:02,200
what I was trying to do with his rockets

57
00:03:09,900 --> 00:03:05,970
in there everything guess who it was

58
00:03:13,020 --> 00:03:09,910
Rocco patron he was a major in the Army

59
00:03:13,949 --> 00:03:13,030
at the time and he and I got to know

60
00:03:15,960 --> 00:03:13,959
each other very well

61
00:03:18,479 --> 00:03:15,970
matter of fact I got along fine with him

62
00:03:21,120 --> 00:03:18,489
too as a matter of fact that was how I

63
00:03:26,640 --> 00:03:21,130

got started and I collected a good bit

64

00:03:30,180 --> 00:03:26,650

of data the division that Garrett ricing

65

00:03:31,770 --> 00:03:30,190

had had the responsibility for all of

66

00:03:34,560 --> 00:03:31,780

the environmental and design

67

00:03:36,360 --> 00:03:34,570

requirements that went into as a matter

68

00:03:41,250 --> 00:03:36,370

of fact the Jupiter the Redstone and

69

00:03:45,930 --> 00:03:41,260

also into the became the Saturn and a

70

00:03:48,390 --> 00:03:45,940

lot of other activities JSC well we

71

00:03:50,610 --> 00:03:48,400

formed Marshall in 1960 okay

72

00:03:52,530 --> 00:03:50,620

and when we were working the Saturn and

73

00:03:53,270 --> 00:03:52,540

everything all the all the

74

00:03:55,670 --> 00:03:53,280

environmentalist

75

00:03:57,650 --> 00:03:55,680

requirements came out of my division so

76
00:03:59,900 --> 00:03:57,660
when we moved over from the Army you did

77
00:04:02,570 --> 00:03:59,910
not have to move you could stay if you

78
00:04:04,760 --> 00:04:02,580
had a position over there well they

79
00:04:07,370 --> 00:04:04,770
offered Gerhardt a lab director's

80
00:04:09,790 --> 00:04:07,380
position if he stayed so it didn't take

81
00:04:12,610 --> 00:04:09,800
Gerhardt long to make up his mind and

82
00:04:16,460 --> 00:04:12,620
about two months after we had moved over

83
00:04:19,190 --> 00:04:16,470
Ernest Geisler was a lab director and he

84
00:04:20,930 --> 00:04:19,200
called me and said the only I'd like to

85
00:04:23,990 --> 00:04:20,940
be that the Germans tend to pronounce

86
00:04:25,520 --> 00:04:24,000
bill Beale had had a ring to it anyway

87
00:04:27,740 --> 00:04:25,530
he said I'd like for you to take the

88
00:04:29,810 --> 00:04:27,750

division and I said well dr. geysler will

89

00:04:32,090 --> 00:04:29,820

give it a try and see how it works out

90

00:04:33,710 --> 00:04:32,100

and you know if it works out and it

91

00:04:39,589 --> 00:04:33,720

worked out well we got along fine

92

00:04:44,299 --> 00:04:42,200

oh I didn't give it any consideration as

93

00:04:46,010 --> 00:04:44,309

being something difficult to do it was

94

00:04:49,119 --> 00:04:46,020

just something that we were going to do

95

00:04:53,359 --> 00:04:49,129

but that was the attitude

96

00:04:55,399 --> 00:04:53,369

there wasn't an attitude and and and the

97

00:04:57,290 --> 00:04:55,409

Germans didn't create that attitude that

98

00:05:00,619 --> 00:04:57,300

we couldn't do it it was just a matter

99

00:05:03,219 --> 00:05:00,629

of doing it and you got to remember that

100

00:05:06,969 --> 00:05:03,229

we were already working on the Saturn

101
00:05:09,679 --> 00:05:06,979
before we transferred over from the Army

102
00:05:11,239 --> 00:05:09,689
our time got charged to the Persian

103
00:05:14,239 --> 00:05:11,249
rocket system but that's beside the

104
00:05:16,779 --> 00:05:14,249
point the Persian worked out fine too by

105
00:05:18,709 --> 00:05:16,789
the way but there was no charge code for

106
00:05:21,199 --> 00:05:18,719
Saturday wouldn't mind whether they had

107
00:05:25,999 --> 00:05:21,209
a name or not but then but anyway moving

108
00:05:28,010 --> 00:05:26,009
over there was a strong feeling of

109
00:05:30,409 --> 00:05:28,020
confidence to be quite candid with you

110
00:05:32,989 --> 00:05:30,419
now everybody took it serious when Braun

111
00:05:34,820 --> 00:05:32,999
had a real talent for getting people to

112
00:05:37,040 --> 00:05:34,830
feel like they were a part of a team and

113
00:05:40,070 --> 00:05:37,050

working together von Braun created an

114

00:05:43,189 --> 00:05:40,080

atmosphere that the Saturn 5 was our

115

00:05:45,949 --> 00:05:43,199

vehicle when somebody else's and people

116

00:05:48,559 --> 00:05:45,959

worked on it accordingly couple of years

117

00:05:50,540 --> 00:05:48,569

or something into the system that we got

118

00:05:53,359 --> 00:05:50,550

those of us that had the vision got a

119

00:05:56,209 --> 00:05:53,369

memorandum from personnel we were to

120

00:05:58,249 --> 00:05:56,219

instruct our people that they needed to

121

00:06:00,379 --> 00:05:58,259

go home at the regular hour because

122

00:06:02,259 --> 00:06:00,389

there was not funding to cover salaries

123

00:06:04,579 --> 00:06:02,269

and all that stuff well they weren't

124

00:06:06,879 --> 00:06:04,589

people were staying over time and

125

00:06:09,619 --> 00:06:06,889

working they weren't getting paid for it

126

00:06:11,629 --> 00:06:09,629

it was because they were going to build

127

00:06:15,309 --> 00:06:11,639

their vehicle to make sure it worked ok

128

00:06:18,980 --> 00:06:15,319

but ever needed to be done got done well

129

00:06:20,989 --> 00:06:18,990

it continued to you you had to make had

130

00:06:23,389 --> 00:06:20,999

to not make but you had to encourage

131

00:06:26,899 --> 00:06:23,399

people to go home that's the gospel

132

00:06:30,489 --> 00:06:26,909

truth of it and one of my branch chief

133

00:06:34,249 --> 00:06:30,499

met me in the grocery store one day and

134

00:06:36,759 --> 00:06:34,259

she says Bilson I need you to speak with

135

00:06:39,230 --> 00:06:36,769

Orville he was one of my branch Chiefs I

136

00:06:41,329 --> 00:06:39,240

got a problem well I thought maybe he

137

00:06:42,980 --> 00:06:41,339

was out in the car out there or

138

00:06:47,059 --> 00:06:42,990

something and he'd hurt himself or

139

00:06:48,709 --> 00:06:47,069

whatnot and I said well Anna what is it

140

00:06:50,930 --> 00:06:48,719

that I can do I'll be glad to help you

141

00:06:54,440 --> 00:06:50,940

if I can she said you have to

142

00:06:55,940 --> 00:06:54,450

do something said he wakes up at two and

143

00:06:58,780 --> 00:06:55,950

three o'clock in the morning and starts

144

00:07:01,400 --> 00:06:58,790

working and I can't get him back to bed

145

00:07:04,250 --> 00:07:01,410

now that's the kind of a work attitude

146

00:07:08,150 --> 00:07:04,260

that existed at Marshall Space Flight

147

00:07:10,190 --> 00:07:08,160

Center in the in the 60s on the satyr

148

00:07:14,900 --> 00:07:10,200

vehicle and that's why we never lost a

149

00:07:23,309 --> 00:07:18,809

if they impacted it I never knew it

150

00:07:26,249 --> 00:07:23,319

we never got in both I didn't and I

151
00:07:29,040 --> 00:07:26,259
don't know anybody else in the involved

152
00:07:31,619 --> 00:07:29,050
in what was going on downtown Huntsville

153
00:07:34,200 --> 00:07:31,629
for example or in in Alabama you saw it

154
00:07:36,300 --> 00:07:34,210
in the paper and all this okay but

155
00:07:38,820 --> 00:07:36,310
things were a little bit different too

156
00:07:42,770 --> 00:07:38,830
and in the personnel area okay they were

157
00:07:46,800 --> 00:07:42,780
making inroads to work with Alabama A&M

158
00:07:51,149 --> 00:07:46,810
to bring them you know involved but that

159
00:07:53,930 --> 00:07:51,159
wasn't very easy to do because the they

160
00:07:57,589 --> 00:07:53,940
did they didn't have the the background

161
00:08:00,990 --> 00:07:57,599
technical background see at that time

162
00:08:05,550 --> 00:08:01,000
Donna they they got it very rapidly okay

163
00:08:08,580 --> 00:08:05,560

and as time went by they didn't have any

164

00:08:13,760 --> 00:08:08,590

engineering as I remember capability in

165

00:08:16,830 --> 00:08:13,770

class work at A&M they were agricultural

166

00:08:19,879 --> 00:08:16,840

oriented as a matter of fact and in that

167

00:08:26,700 --> 00:08:19,889

area and educate they had an education

168

00:08:32,159 --> 00:08:28,469

a lot of the environmental requirements

169

00:08:35,730 --> 00:08:32,169

that went into the Saturn I went to the

170

00:08:40,700 --> 00:08:35,740

Rockies Jenna were not the same type

171

00:08:43,290 --> 00:08:40,710

that will not based on aircraft ok

172

00:08:43,980 --> 00:08:43,300

mainly because their craft didn't go

173

00:08:46,590 --> 00:08:43,990

vertically

174

00:08:48,060 --> 00:08:46,600

they went horizontally now we picked up

175

00:08:51,269 --> 00:08:48,070

some of the turbulence and in the

176
00:08:53,670 --> 00:08:51,279
dynamics there but we made some of the

177
00:08:55,650 --> 00:08:53,680
very first measurements and then I'm has

178
00:08:57,690 --> 00:08:55,660
a lot of free agency I had a lot of free

179
00:08:59,490 --> 00:08:57,700
agents let's put that way and dealing

180
00:09:00,420 --> 00:08:59,500
with headquarters on getting support too

181
00:09:03,389 --> 00:09:00,430
for that matter

182
00:09:04,380 --> 00:09:03,399
and because we needed the data and it

183
00:09:08,400 --> 00:09:04,390
didn't exist

184
00:09:11,579 --> 00:09:08,410
for example the up to the mountain

185
00:09:13,920 --> 00:09:11,589
I don't know typically around about 25

186
00:09:16,769 --> 00:09:13,930
kilometers or so it's about as high as

187
00:09:19,620 --> 00:09:16,779
you had any structure on the atmosphere

188
00:09:23,220 --> 00:09:19,630

from the balloon sounding we needed it

189

00:09:25,769 --> 00:09:23,230

higher than that so we built rockets and

190

00:09:28,800 --> 00:09:25,779

we fired them higher than that okay up

191

00:09:30,210 --> 00:09:28,810

to get stage separation and on up group

192

00:09:34,320 --> 00:09:30,220

shot all the way up to about a hundred

193

00:09:37,740 --> 00:09:34,330

kilometers and we got some of the first

194

00:09:39,420 --> 00:09:37,750

data that was ever required and we

195

00:09:40,440 --> 00:09:39,430

published it as a matter of fact and

196

00:09:43,730 --> 00:09:40,450

then the literature

197

00:09:47,070 --> 00:09:43,740

alrighty we had four I think it wasn't

198

00:09:50,070 --> 00:09:47,080

nike tomahawk rockets that's two-stage

199

00:09:54,720 --> 00:09:50,080

rocket as a matter of fact and we had

200

00:09:57,269 --> 00:09:54,730

had little or no information on the time

201
00:09:58,949 --> 00:09:57,279
to change of the wind structure or

202
00:10:02,280 --> 00:09:58,959
anything else up there over a short

203
00:10:04,170 --> 00:10:02,290
period of time so we took all four of

204
00:10:08,519 --> 00:10:04,180
those as form I believe may have been

205
00:10:11,670 --> 00:10:08,529
five but anyway we took of all and fired

206
00:10:15,449 --> 00:10:11,680
them at Wallops Island and a 24 hour

207
00:10:18,420 --> 00:10:15,459
period I did not have to go ask

208
00:10:20,220 --> 00:10:18,430
anybody's permission to do it but things

209
00:10:24,000 --> 00:10:20,230
were different back then and isn't that

210
00:10:26,010 --> 00:10:24,010
one just me okay a lot of the other

211
00:10:28,889 --> 00:10:26,020
decisions were you know made right there

212
00:10:32,639 --> 00:10:28,899
and by the people that were responsible

213
00:10:33,870 --> 00:10:32,649

I mean Tom made his air dynamic what

214

00:10:36,150 --> 00:10:33,880

they did in the wind clothes and all

215

00:10:37,800 --> 00:10:36,160

kinds of stuff he didn't have to go get

216

00:10:39,500 --> 00:10:37,810

it cleared by somebody he was

217

00:10:41,870 --> 00:10:39,510

responsible for it and

218

00:10:43,699 --> 00:10:41,880

and we didn't have any yard and that

219

00:10:45,860 --> 00:10:43,709

problems either for that matter but

220

00:10:49,300 --> 00:10:45,870

there was a lot of apprehension because

221

00:10:52,400 --> 00:10:49,310

it was something new for one thing

222

00:10:55,970 --> 00:10:52,410

you've got to remember we built the

223

00:11:01,189 --> 00:10:55,980

Saturn one then we built the Saturn 1b

224

00:11:05,030 --> 00:11:01,199

and then the Saturn 5 so what we learned

225

00:11:07,040 --> 00:11:05,040

on the one we transferred to the 1b and

226

00:11:10,310 --> 00:11:07,050

what we learned on the 1b we transferred

227

00:11:12,199 --> 00:11:10,320

to the 5 so there's a difference back in

228

00:11:15,079 --> 00:11:12,209

that era the Germans are a little bit

229

00:11:19,759 --> 00:11:15,089

different in that regard they work their

230

00:11:23,389 --> 00:11:19,769

way out they they they were very strong

231

00:11:25,550 --> 00:11:23,399

about testing things and making sure the

232

00:11:28,069 --> 00:11:25,560

things were going to work sometimes to

233

00:11:31,160 --> 00:11:28,079

the thought that we they broke them in

234

00:11:32,780 --> 00:11:31,170

the process to find out so they they

235

00:11:37,850 --> 00:11:32,790

made sure things worked let's put it

236

00:11:42,139 --> 00:11:40,069

well you got to remember it was not the

237

00:11:45,739 --> 00:11:42,149

first Saturn five

238

00:11:47,359 --> 00:11:45,749

I mean Apollo eight went up and so there

239

00:11:48,829 --> 00:11:47,369

was a lot of confidence that it was

240

00:11:50,660 --> 00:11:48,839

going to work okay

241

00:11:53,139 --> 00:11:50,670

because a lot of testing had been done

242

00:11:54,949 --> 00:11:53,149

on it but still there was always

243

00:11:57,319 --> 00:11:54,959

apprehension you know you never know

244

00:11:58,400 --> 00:11:57,329

what's going to happen when you launch

245

00:12:01,309 --> 00:11:58,410

one of these birds

246

00:12:02,809 --> 00:12:01,319

nobody was worried that I know uh we

247

00:12:05,989 --> 00:12:02,819

were pretty confident that what we'd

248

00:12:08,780 --> 00:12:05,999

done was gonna work and it did it work

249

00:12:13,989 --> 00:12:08,790

for all of us matter of fact what made

250

00:12:17,539 --> 00:12:13,999

it work was the teamwork that developed

251

00:12:21,410 --> 00:12:17,549

and the understanding of who was

252

00:12:26,600 --> 00:12:21,420

responsible for what between Martha and

253

00:12:29,079 --> 00:12:26,610

the Cape and Houston okay and among the

254

00:12:31,100 --> 00:12:29,089

working people there was a lot of

255

00:12:35,379 --> 00:12:31,110

interactions and all this type of stuff

256

00:12:37,970 --> 00:12:35,389

okay it worked as a team it really did

257

00:12:43,220 --> 00:12:37,980

for example Houston did not have a

258

00:12:45,350 --> 00:12:43,230

counterpart to my division neither did

259

00:12:47,689 --> 00:12:45,360

the Cape for that matter we worked with

260

00:12:51,169 --> 00:12:47,699

him just like they were part of Marshall

261

00:12:53,840 --> 00:12:51,179

okay and I had complete free agency in

262

00:12:55,759 --> 00:12:53,850

that regard and then there were kind of

263

00:13:01,489 --> 00:12:55,769

interesting things that happened - for

264

00:13:04,400 --> 00:13:01,499

example we did not have the low level

265

00:13:08,059 --> 00:13:04,410

liftoff wind conditions that were going

266

00:13:12,259 --> 00:13:08,069

to encounter at the Cape other above

267

00:13:14,749 --> 00:13:12,269

about 50 feet or so so we put in a 500

268

00:13:18,530 --> 00:13:14,759

foot Tower down the 150 meters really

269

00:13:20,210 --> 00:13:18,540

but not a father anyway I had no

270

00:13:23,329 --> 00:13:20,220

problems whatsoever getting it approved

271

00:13:26,239 --> 00:13:23,339

to put in as a matter of fact once we

272

00:13:29,650 --> 00:13:26,249

got it put in talked to Deva see he had

273

00:13:31,879 --> 00:13:29,660

over Leicester keen on the guy that was

274

00:13:34,879 --> 00:13:31,889

responsible for making sure the tire got

275

00:13:36,379 --> 00:13:34,889

done right call me and say ask bill

276

00:13:39,229 --> 00:13:36,389

where he wants the other tower

277

00:13:42,199 --> 00:13:39,239

well we didn't need but one but that's

278

00:13:43,579 --> 00:13:42,209

but neither here no there we had the

279

00:13:45,499 --> 00:13:43,589

information we needed for the

280

00:13:47,120 --> 00:13:45,509

overturning moment calculations and all

281

00:13:49,130 --> 00:13:47,130

that liftoff on the pad

282

00:13:51,110 --> 00:13:49,140

that so we really want to worried about

283

00:13:53,090 --> 00:13:51,120

it same thing and moving it from the

284

00:13:56,990 --> 00:13:53,100

vertical Assembly Building out to the

285

00:13:59,450 --> 00:13:57,000

pad mm-hmm sitting on top of that well

286

00:14:01,670 --> 00:13:59,460

we had to do a lot of analysis of the

287

00:14:04,370 --> 00:14:01,680

data and everything and run for them to

288

00:14:07,990 --> 00:14:04,380

run it through their engineering

289

00:14:10,820 --> 00:14:08,000

calculations and we didn't just do it

290

00:14:13,610 --> 00:14:10,830

the inputs and hand them a piece of

291

00:14:16,580 --> 00:14:13,620

paper and walk away we worked with them

292

00:14:18,950 --> 00:14:16,590

so they would understand what it was

293

00:14:21,470 --> 00:14:18,960

that they were using and how we arrived

294

00:14:24,830 --> 00:14:21,480

at it that was important I think to note

295

00:14:26,630 --> 00:14:24,840

and for example when we when the

296

00:14:29,870 --> 00:14:26,640

vertical Assembly Building was going to

297

00:14:32,060 --> 00:14:29,880

be built the promise for that came out

298

00:14:34,400 --> 00:14:32,070

of my division there when load

299

00:14:36,620 --> 00:14:34,410

requirements believe it or not and when

300

00:14:40,040 --> 00:14:36,630

I gave the presentation down to Caitlin

301

00:14:42,560 --> 00:14:40,050

dr. Davis and I don't know 25 or 30 of

302

00:14:45,230 --> 00:14:42,570

his people we were talking about it and

303

00:14:48,470 --> 00:14:45,240

telling him how we had derived it and I

304

00:14:51,590 --> 00:14:48,480

told him it was a 99th percentile for

305

00:14:54,050 --> 00:14:51,600

the worst win month conditions for of

306

00:14:57,250 --> 00:14:54,060

the Cape that we used and I never will

307

00:14:59,330 --> 00:14:57,260

forget that services will beYOU that

308

00:15:01,130 --> 00:14:59,340

doctors good but I want it with a

309

00:15:04,430 --> 00:15:01,140

hundred percent confidence that it won't

310

00:15:06,140 --> 00:15:04,440

be exceeded well technically speaking

311

00:15:09,440 --> 00:15:06,150

from a statistical point of view that

312

00:15:12,050 --> 00:15:09,450

you you can't you can't do that and I

313

00:15:15,470 --> 00:15:12,060

never will forget I looked up and I said

314

00:15:19,550 --> 00:15:15,480

how am I going to explain this to her

315

00:15:22,700 --> 00:15:19,560

he'll grasp it and I said dr. Davis I'll

316

00:15:24,620 --> 00:15:22,710

tell you your house will be gone before

317

00:15:26,660 --> 00:15:24,630

the vertical Assembly Building will I

318

00:15:28,370 --> 00:15:26,670

never will forget he looked at me he

319

00:15:31,340 --> 00:15:28,380

says dust is good we will go ahead now

320

00:15:36,110 --> 00:15:31,350

and so there was interesting things like

321

00:15:39,580 --> 00:15:36,120

that too made decisions got made of a

322

00:15:43,939 --> 00:15:39,590

very very major technical factor

323

00:15:45,679 --> 00:15:43,949

nowadays everybody's gotta come

324

00:15:47,840 --> 00:15:45,689

and I pad in front of them and a

325

00:15:51,530 --> 00:15:47,850

computer running and they run the stuff

326

00:15:54,410 --> 00:15:51,540

dozens and dozens of time back then we

327

00:15:57,169 --> 00:15:54,420

did not we had to take what we did over

328

00:15:58,759 --> 00:15:57,179

to the comp Lev and they ran it and they

329

00:16:01,429 --> 00:15:58,769

would call and tell us to come get her

330

00:16:04,669 --> 00:16:01,439

output so you thought your way through

331

00:16:10,300 --> 00:16:04,679

what you were doing very carefully

332

00:16:15,100 --> 00:16:13,120

there was a good team relationship and

333

00:16:16,269 --> 00:16:15,110

von braun created that i don't want to

334

00:16:19,330 --> 00:16:16,279

make it sound like he walked on water

335

00:16:22,030 --> 00:16:19,340

okay he was just like we all are I've

336

00:16:24,970 --> 00:16:22,040

said in many meetings were decisions

337

00:16:26,769 --> 00:16:24,980

were being made okay and he made most

338

00:16:30,100 --> 00:16:26,779

all your technical decisions of any

339

00:16:32,410 --> 00:16:30,110

consequence and if you were presenting

340

00:16:34,630 --> 00:16:32,420

from one point of view and you from

341

00:16:36,880 --> 00:16:34,640

another point of view he'd listened to

342

00:16:39,790 --> 00:16:36,890

both points of view I need ask you

343

00:16:42,880 --> 00:16:39,800

questions and everything okay now he

344

00:16:46,740 --> 00:16:42,890

might decide to go with your point of

345

00:16:49,360 --> 00:16:46,750

view carried okay but you were still

346

00:16:51,070 --> 00:16:49,370

free agent to go back to the lab and

347

00:16:51,790 --> 00:16:51,080

then whatnot and try to answer his

348

00:16:54,310 --> 00:16:51,800

questions

349

00:16:57,550 --> 00:16:54,320

and go through it and if you thought you

350

00:16:59,500 --> 00:16:57,560

had he would be put in and he would

351
00:17:02,800 --> 00:16:59,510
reconvene the meeting and go and go back

352
00:17:06,189 --> 00:17:02,810
over it and he might change his mind but

353
00:17:08,020 --> 00:17:06,199
there was none of this well I don't

354
00:17:10,420 --> 00:17:08,030
understand why he did that everybody

355
00:17:13,240 --> 00:17:10,430
took it and went forward all righty

356
00:17:21,240 --> 00:17:13,250
the idea was to make sure we did not

357
00:17:28,590 --> 00:17:24,030
I played deuces out at the Space and

358
00:17:30,300 --> 00:17:28,600
Rocket Center and it's interesting to

359
00:17:33,870 --> 00:17:30,310
talk to people from all over the world

360
00:17:36,660 --> 00:17:33,880
they have a tremendous admiration and

361
00:17:39,780 --> 00:17:36,670
I'm not joking because it gets played on

362
00:17:41,550 --> 00:17:39,790
us because we're there and it's just

363
00:17:44,910 --> 00:17:41,560

interesting to talk to the people they

364

00:17:46,500 --> 00:17:44,920

really do have a tremendous and they'll

365

00:17:49,350 --> 00:17:46,510

tell you so as a matter of fact

366

00:17:51,150 --> 00:17:49,360

admiration even though personally the

367

00:17:54,620 --> 00:17:51,160

individual they're talking to me I may

368

00:17:57,690 --> 00:17:54,630

or may not he represents what NASA did