



1
00:00:16,190 --> 00:00:12,530
I think first about the moment when the

2
00:00:19,670 --> 00:00:16,200
moon landing took place itself I was at

3
00:00:21,980 --> 00:00:19,680
my son's place were sitting on the front

4
00:00:27,550 --> 00:00:21,990
lawn and had the television set in front

5
00:00:32,359 --> 00:00:27,560
of us and watch the landing at that time

6
00:00:34,790 --> 00:00:32,369
we were all in a sort of euphoria the

7
00:00:40,160 --> 00:00:34,800
combination of all the work that had

8
00:00:42,619 --> 00:00:40,170
been going on before we had absolute

9
00:00:48,729 --> 00:00:42,629
confidence that the landing would work

10
00:00:54,049 --> 00:00:48,739
only in retrospect later it dawn on me

11
00:00:56,840 --> 00:00:54,059
the enormity of this event it didn't

12
00:00:59,509 --> 00:00:56,850
dawn as while it happens because we are

13
00:01:03,759 --> 00:00:59,519

so involved in it you've in it had to

14

00:01:06,880 --> 00:01:03,769

work and it did we had great confidence

15

00:01:11,359 --> 00:01:06,890

that the landing would be successful

16

00:01:14,810 --> 00:01:11,369

after all our highest authority Verner

17

00:01:19,730 --> 00:01:14,820

von Braun said so I was the main

18

00:01:24,520 --> 00:01:19,740

developer of the launch facilities the

19

00:01:29,240 --> 00:01:24,530

crawler which transported the sang the

20

00:01:32,240 --> 00:01:29,250

taut umbilical Tower the vertical

21

00:01:38,109 --> 00:01:32,250

Assembly Building and then they launched

22

00:01:42,590 --> 00:01:38,119

machinery itself I patent was the whole

23

00:01:45,200 --> 00:01:42,600

hoedown mechanism that kept Saturn 5 on

24

00:01:50,660 --> 00:01:45,210

the launch pad why all the engines were

25

00:01:53,300 --> 00:01:50,670

firing but Jagger at that time we didn't

26
00:01:59,029 --> 00:01:53,310
have computers we did things with a

27
00:02:04,309 --> 00:01:59,039
slide rule we had central computers for

28
00:02:07,249 --> 00:02:04,319
flight mechanics but we I worked in the

29
00:02:10,840 --> 00:02:07,259
development of the whole launch

30
00:02:15,410 --> 00:02:10,850
machinery and launch equipment we didn't

31
00:02:19,250 --> 00:02:15,420
we had large groups of designers which

32
00:02:21,540 --> 00:02:19,260
was supervised the fascinating thing

33
00:02:25,470 --> 00:02:21,550
about it was

34
00:02:32,000 --> 00:02:25,480
was no president there was no precedent

35
00:02:38,670 --> 00:02:32,010
on what we were doing know how to books

36
00:02:42,060 --> 00:02:38,680
so out of our own imagination and ideas

37
00:02:44,490 --> 00:02:42,070
we had to form what later became the

38
00:02:48,020 --> 00:02:44,500

hardware that we are familiar with we

39

00:02:50,970 --> 00:02:48,030

had a bunch of very very creative people

40

00:02:55,470 --> 00:02:50,980

we had not only had to work accurately

41

00:02:58,110 --> 00:02:55,480

we had to work fast because as you

42

00:03:02,310 --> 00:02:58,120

remember we wanted to launch it to the

43

00:03:05,610 --> 00:03:02,320

moon before the decade was over there

44

00:03:08,070 --> 00:03:05,620

are many problems to overcome but we had

45

00:03:11,070 --> 00:03:08,080

confidence in ourselves we never doubted

46

00:03:14,970 --> 00:03:11,080

that we couldn't do it he never doubted

47

00:03:18,350 --> 00:03:14,980

it was just a certain amount of work

48

00:03:24,230 --> 00:03:18,360

that had to be done we worked long hours

49

00:03:30,360 --> 00:03:24,240

and and it paid off so the methods of

50

00:03:34,410 --> 00:03:30,370

managing a group to come up with all the

51
00:03:40,110 --> 00:03:34,420
concepts in the final design for other

52
00:03:41,100 --> 00:03:40,120
launch hardware ran place and everybody

53
00:03:45,050 --> 00:03:41,110
gave his best

54
00:03:47,790 --> 00:03:45,060
we had a certain common enthusiasm a

55
00:03:53,310 --> 00:03:47,800
certain atmosphere was within our

56
00:03:58,710 --> 00:03:53,320
organization there was just super very

57
00:04:05,370 --> 00:03:58,720
great enthusiasm and everybody gave his

58
00:04:08,490 --> 00:04:05,380
best without being coaxed we all work

59
00:04:10,800 --> 00:04:08,500
for a common goal be realized we did we

60
00:04:16,229 --> 00:04:10,810
did something we are about to do

61
00:04:19,460 --> 00:04:16,239
something that has never done before and

62
00:04:23,580 --> 00:04:19,470
like I said before only in retrospect I

63
00:04:29,310 --> 00:04:23,590

personally Bank realized the enormity of

64

00:04:31,969 --> 00:04:29,320

the horror undertaken the idea to go to

65

00:04:35,420 --> 00:04:31,979

the moon to send people to the moon

66

00:04:38,770 --> 00:04:35,430

originated decades before

67

00:04:42,560 --> 00:04:38,780

not only after Kennedy announced our

68

00:04:45,890 --> 00:04:42,570

intentions decades before that when a

69

00:04:48,320 --> 00:04:45,900

young people we were rocket enthusiasts

70

00:04:52,540 --> 00:04:48,330

and the moon of course was the obvious

71

00:04:55,189 --> 00:04:52,550

first target and space so we're mentally

72

00:05:00,129 --> 00:04:55,199

oriented toward this mission in

73

00:05:04,400 --> 00:05:00,139

penemuende during world war ii secretly

74

00:05:06,980 --> 00:05:04,410

we developed a moon rocket on paper it

75

00:05:09,620 --> 00:05:06,990

had to be secret because you're not

76

00:05:13,790 --> 00:05:09,630

supposed to do it yeah but we had to

77

00:05:18,770 --> 00:05:13,800

build weapons so the irony was when we

78

00:05:22,820 --> 00:05:18,780

came to United States we again had to

79

00:05:24,920 --> 00:05:22,830

build weapons and our success late I was

80

00:05:29,060 --> 00:05:24,930

based again on something that we did in

81

00:05:32,050 --> 00:05:29,070

secret which was in this case designing

82

00:05:39,350 --> 00:05:36,010

everybody was happy that we did it later

83

00:05:44,870 --> 00:05:39,360

but our moon plants they are always

84

00:05:46,159 --> 00:05:44,880

there if when the go-ahead came we know

85

00:05:53,870 --> 00:05:46,169

exactly what to do

86

00:05:58,040 --> 00:05:53,880

Ronna from brown included many qualities

87

00:06:02,510 --> 00:05:58,050

in one person he was a great scientist

88

00:06:06,740 --> 00:06:02,520

engineer a great politician they greatly

89

00:06:10,730 --> 00:06:06,750

a born leader and he had something that

90

00:06:14,149 --> 00:06:10,740

I wished every manager would have he had

91

00:06:19,180 --> 00:06:14,159

a great sense of humor it could be very

92

00:06:25,790 --> 00:06:19,190

funny the main thing is we trusted him

93

00:06:30,610 --> 00:06:25,800

without limits he was a true leader of a

94

00:06:33,680 --> 00:06:30,620

team he had the goal and he hated

95

00:06:37,040 --> 00:06:33,690

determination to follow it and he had

96

00:06:38,350 --> 00:06:37,050

the team to carry it out he was very

97

00:06:42,680 --> 00:06:38,360

easy to work with

98

00:06:45,939 --> 00:06:42,690

he was very people minded his doors were

99

00:06:54,550 --> 00:06:50,070

when mistakes were made and admitted

100

00:06:58,600 --> 00:06:54,560

there on who did the mistake was getting

101
00:07:04,570 --> 00:06:58,610
an award that was his style of

102
00:07:11,200 --> 00:07:04,580
management openness complete trust among

103
00:07:19,970 --> 00:07:15,920
when one obvious part of our present

104
00:07:22,280 --> 00:07:19,980
program are the launch facilities we use

105
00:07:26,570 --> 00:07:22,290
the same crawler that carried the sarin

106
00:07:29,300 --> 00:07:26,580
file to carry the shuttle we have the

107
00:07:32,320 --> 00:07:29,310
same vertical Assembly Building to

108
00:07:35,440 --> 00:07:32,330
prepare the shuttle before launch

109
00:07:39,140 --> 00:07:35,450
then we had in the Saturday's

110
00:07:43,670 --> 00:07:39,150
philosophically much has been lost I

111
00:07:48,020 --> 00:07:43,680
think after the Apollo days my personal

112
00:07:51,680 --> 00:07:48,030
opinion is is not much has been

113
00:07:55,130 --> 00:07:51,690

transferred from our Apollo experience

114

00:07:58,220 --> 00:07:55,140

to the shuttle experience and I think

115

00:08:01,130 --> 00:07:58,230

events have shown that while the first

116

00:08:03,560 --> 00:08:01,140

moon landing was going on we were

117

00:08:07,310 --> 00:08:03,570

already preparing for a follow-up

118

00:08:11,180 --> 00:08:07,320

program it was called the integrated

119

00:08:13,790 --> 00:08:11,190

space program it was initiated by George

120

00:08:17,330 --> 00:08:13,800

Miller and NASA headquarters I was

121

00:08:21,020 --> 00:08:17,340

involved in laying out the elements of

122

00:08:23,390 --> 00:08:21,030

this program the content of the

123

00:08:25,570 --> 00:08:23,400

follow-on program was of course number

124

00:08:31,010 --> 00:08:25,580

one a shadow

125

00:08:34,790 --> 00:08:31,020

reusable shuttle a space station a base

126

00:08:36,800 --> 00:08:34,800

on the moon and a face on Mars the

127

00:08:40,089 --> 00:08:36,810

interesting thing about this program are

128

00:08:45,290 --> 00:08:40,099

these elements these program elements

129

00:08:47,540 --> 00:08:45,300

the derivatives of the Shannon fire the

130

00:08:52,040 --> 00:08:47,550

stages of the Saturn the hardware of the

131

00:08:56,210 --> 00:08:52,050

Saturn program was modified to build

132

00:08:59,300 --> 00:08:56,220

lunar bases in mass basis one new thing

133

00:09:02,960 --> 00:08:59,310

was a shuttle like I said and a nucleus

134

00:09:06,140 --> 00:09:02,970

shuttle between Earth and Mars so a

135

00:09:10,280 --> 00:09:06,150

rather grandiose program of course all

136

00:09:13,970 --> 00:09:10,290

these plants died except the space

137

00:09:17,660 --> 00:09:13,980

shuttle as you know it's the only piece

138

00:09:20,810 --> 00:09:17,670

of that grandiose plan that survived so

139

00:09:23,150 --> 00:09:20,820

we were quite busy thinking about post

140

00:09:24,620 --> 00:09:23,160

Apollo there was one thing that had

141

00:09:28,130 --> 00:09:24,630

changed though

142

00:09:31,640 --> 00:09:28,140

the public perception of space there was

143

00:09:34,100 --> 00:09:31,650

no more support for any large missions

144

00:09:38,350 --> 00:09:34,110

and this did the integrated space

145

00:09:43,100 --> 00:09:38,360

program in a good I think we are fake

146

00:09:45,740 --> 00:09:43,110

that the Apollo moon landing was one of

147

00:09:50,590 --> 00:09:45,750

the greatest events in the area of

148

00:09:54,440 --> 00:09:50,600

Technology and science of mankind I

149

00:09:59,570 --> 00:09:54,450

think it peril is the building of the

150

00:10:02,660 --> 00:09:59,580

pyramids other great works of humans it

151

00:10:05,060 --> 00:10:02,670

was the first step out of the earth to

152

00:10:10,280 --> 00:10:05,070

another heavenly body this whole project

153

00:10:12,350 --> 00:10:10,290

had an enormity about it that many

154

00:10:15,770 --> 00:10:12,360

people like I said before did not

155

00:10:20,210 --> 00:10:15,780

perceive but it was our done there was a

156

00:10:25,660 --> 00:10:20,220

Vietnam war going on the infamous get

157

00:10:31,450 --> 00:10:25,670

know who that drained all the resources

158

00:10:35,090 --> 00:10:31,460

not only economically but also any any

159

00:10:37,970 --> 00:10:35,100

idealistic resources in the American

160

00:10:42,350 --> 00:10:37,980

people I don't think that if Kennedy

161

00:10:45,380 --> 00:10:42,360

would have lived that we would have done

162

00:10:49,670 --> 00:10:45,390

much more than we would have done than

163

00:10:54,620 --> 00:10:49,680

we did because the political scenery had

164

00:11:01,730 --> 00:10:58,129

it had an influence but a delayed

165

00:11:06,050 --> 00:11:01,740

influence because the program had enough

166

00:11:10,249 --> 00:11:06,060

momentum to go on during these political

167

00:11:12,889 --> 00:11:10,259

upheavals that we had in our country it

168

00:11:17,180 --> 00:11:12,899

had enough momentum to carry through to

169

00:11:21,559 --> 00:11:17,190

Apollo 17 its effect was delayed Apollo

170

00:11:24,650 --> 00:11:21,569

18 was scrubbed cancelled and the after

171

00:11:28,090 --> 00:11:24,660

you know what happened nothing so these

172

00:11:31,430 --> 00:11:28,100

factors did have an influence

173

00:11:34,819 --> 00:11:31,440

fortunately it delayed influence walking

174

00:11:38,269 --> 00:11:34,829

people historically had been non

175

00:11:42,199 --> 00:11:38,279

politicians they didn't care much about

176

00:11:45,860 --> 00:11:42,209

politics they were tied and almost

177

00:11:51,290 --> 00:11:45,870

married to their work it's great

178

00:11:56,470 --> 00:11:51,300

enthusiasm they care very little right

179

00:11:59,780 --> 00:11:56,480

or wrong about political scene scenery

180

00:12:04,069 --> 00:11:59,790

that went on around them that can be

181

00:12:07,370 --> 00:12:04,079

said even during World War two when we

182

00:12:11,499 --> 00:12:07,380

developed the v2 we were enthusiastic

183

00:12:14,929 --> 00:12:11,509

market people and fascinated by our work

184

00:12:18,350 --> 00:12:14,939

and cared very little about what went on

185

00:12:23,929 --> 00:12:18,360

around the same thing happened I think

186

00:12:28,730 --> 00:12:23,939

during the 60s and early 70s when there

187

00:12:30,610 --> 00:12:28,740

was turmoil in the United States we were