



1
00:00:13,460 --> 00:00:21,060
of course lunar landing in 1969 was
the final end of all the efforts that

2
00:00:21,060 --> 00:00:27,029
had been put in the development of
initially missiles and later on as NASA

3
00:00:27,029 --> 00:00:32,160
refer to them as launch vehicles I have
been working on rockets for many many

4
00:00:32,160 --> 00:00:37,620
years I've worked on them before joined
from born in Peterman de and of course

5
00:00:37,620 --> 00:00:40,500
in paint him in the one of the
highlights was the first successful

6
00:00:40,500 --> 00:00:46,440
launch of a v2 and I think even today I
can still say that was probably the

7
00:00:46,440 --> 00:00:52,320
greatest moment in my life but something
that comes definitely very very closer

8
00:00:52,320 --> 00:00:58,850
it was of course a lunar landing for the
EXA launch I was myself at the Cape I

9
00:00:58,850 --> 00:01:05,729
had been initially even the deputy
manager of the launch vehicle part of

10
00:01:05,729 --> 00:01:10,710
support was a set on program and for
that reason of course I was highly

11
00:01:10,710 --> 00:01:16,290
interested I was greatly pleased that it
was a successful launch you may know

12
00:01:16,290 --> 00:01:21,810
that some of the earlier said on fires
has had provided quite some problems we

13
00:01:21,810 --> 00:01:27,900
had a pogo stick problem the luna llena
even showed up some of these type of

14
00:01:27,900 --> 00:01:33,270
technical problems so it was really a
very great accomplishment that with all

15
00:01:33,270 --> 00:01:37,350
the additional testing that had be done
in the meantime that we had a successful

16
00:01:37,350 --> 00:01:43,470
launch we had a successful lunar landing
as I just said I saw the launch at the

17
00:01:43,470 --> 00:01:48,570
Cape but right after the launch of
course I came back to Huntsville and I

18
00:01:48,570 --> 00:01:54,240
saw the landing on television because
unfortunetely there I would have liked

19
00:01:54,240 --> 00:01:59,820
to be but that was just not possible of
course for the lunar landing itself I

20
00:01:59,820 --> 00:02:06,869
was down at the Cape I watched the start
of the Apollo launch vehicle and shortly

21
00:02:06,869 --> 00:02:10,709
after the start
I came back to Huntsville and of course

22
00:02:10,709 --> 00:02:15,459
all of the landing on television
because there was no way to actually be

23
00:02:15,459 --> 00:02:20,230
pleasant at that time on the other end
even today I'm still convinced that this

24
00:02:20,230 --> 00:02:27,280
was really a very successful ending of
all the efforts that had been put in the

25
00:02:27,280 --> 00:02:33,730
development of launch vehicles up to
that time when I became interested as a

26
00:02:33,730 --> 00:02:39,400
young high school student in spaceflight
it was always our dream to leave the

27
00:02:39,400 --> 00:02:44,260
earth and of course so the idea was
always to initially conduct a lunar

28
00:02:44,260 --> 00:02:49,629
landing and even today I still feel one
of these days we will go with cement

29
00:02:49,629 --> 00:02:56,139
launch vehicles to Mars and eventually
populate the entire solar system and

30
00:02:56,139 --> 00:03:01,299
this of course was a very first step in
that direction and I was greatly pleased

31
00:03:01,299 --> 00:03:05,739
that everything worked all right
although as you probably know there were

32
00:03:05,739 --> 00:03:11,199
quite a number of earlier problems with
the launch vehicle but due to the very

33
00:03:11,199 --> 00:03:17,769
so very sound the porch going step by
step into the program I think that's one

34
00:03:17,769 --> 00:03:21,720
of the reasons that there was a
successful launch

35
00:03:24,050 --> 00:03:29,560
of course one big reason for successful
management was run off a moron himself

36
00:03:29,560 --> 00:03:36,470
he laid out the program basically of
course with consolidation of many other

37
00:03:36,470 --> 00:03:41,300
NASA centers so it was not only answer
that was involved he worked very closely

38
00:03:41,300 --> 00:03:47,960
with the manned spacecraft Center in
Houston which was not the Johnson center

39
00:03:47,960 --> 00:03:52,160
in those days it was just a manned
spacecraft sent up foam ball and also

40
00:03:52,160 --> 00:03:57,290
was an excellent manager he was not only
a very good engineer but he also knew

41
00:03:57,290 --> 00:04:02,930
how to set up a system where he could
delegate responsibilities he delegated

42
00:04:02,930 --> 00:04:07,970
responsibility to people who had shown
that they could on the one side

43
00:04:07,970 --> 00:04:13,490
technically mess at the job and that
they were also good managers and of

44
00:04:13,490 --> 00:04:18,920
course we had a relatively large system
of management established starting in

45
00:04:18,920 --> 00:04:25,880
NASA headquarters George Muller was the
actual head of the award program and of

46
00:04:25,880 --> 00:04:31,100
course all the send are supported
directly to him and through that scheme

47
00:04:31,100 --> 00:04:36,470
that in a way triangular management
scheme I think it was a very successful

48
00:04:36,470 --> 00:04:41,870
program and many people have even tried
to build up similar management systems

49
00:04:41,870 --> 00:04:47,810
for the management of era more
earthbound problems right he was not

50
00:04:47,810 --> 00:04:51,740
only a good engineer and he certainly
was a good engineer he saw the problems

51
00:04:51,740 --> 00:04:58,340
he came up with solutions to many of the
problems he was also a good manager as

52
00:04:58,340 --> 00:05:04,270
just indicated and over in and beyond
that he was also an excellent salesman

53
00:05:04,270 --> 00:05:09,770
he was really the one who in Germany
convinced a job an army to support his

54
00:05:09,770 --> 00:05:15,560
ideas of space flight of course he could
not call it spaceflight in those days it

55
00:05:15,560 --> 00:05:21,080
he had to admit that the initial step
into space would be the development of a

56
00:05:21,080 --> 00:05:28,880
military vehicle the a4 as we call it
later on better known as a v2 he

57
00:05:28,880 --> 00:05:33,979
initially developed smaller vehicles
there was of course an a1 and a2 and a3

58
00:05:33,979 --> 00:05:39,020
and even an AIF
five because a step from the AC to the

59
00:05:39,020 --> 00:05:44,840
a4 would have been too late and from
born of echoing Nazis problems and he

60
00:05:44,840 --> 00:05:50,509
came up with proper solutions and as I
said he was also good salesmen he could

61
00:05:50,509 --> 00:05:55,939
convince people in power people who had
the money that his ideas were all right

62
00:05:55,939 --> 00:06:00,740
that they should support these ideas and
make the necessary funding available to

63
00:06:00,740 --> 00:06:05,990
develop such a launch vehicle system
requires tremendous facilities so you

64
00:06:05,990 --> 00:06:12,800
have to spend the considerable amount of
money to build up these facilities from

65
00:06:12,800 --> 00:06:18,259
one always put very great emphasis on
down testing because once your vehicle

66
00:06:18,259 --> 00:06:22,159
is flying and you have a problem there
is not much you can do about it

67
00:06:22,159 --> 00:06:27,620
once you test it in a static firing
condition on one of our big tests since

68
00:06:27,620 --> 00:06:31,490
here at Marshall firstly of course you
can afford to make many many more

69
00:06:31,490 --> 00:06:35,300
measurements you normally save the
vehicle your vehicle does not

70
00:06:35,300 --> 00:06:41,180
necessarily completely fail and blow up
you can correct the mistake and you can

71
00:06:41,180 --> 00:06:45,740
in another test demonstrate that you
have solves a problem and that's what

72
00:06:45,740 --> 00:06:50,509
from bonded also very extensively for
the Saturn 5 program the booster for the

73
00:06:50,509 --> 00:06:56,479
Apollo 10 Shah was initially an army
idea our army commander at the time when

74
00:06:56,479 --> 00:07:02,240
we still work for ABM a here was General
John Boothe Medeiros and he saw the need

75
00:07:02,240 --> 00:07:07,250
for big space boosters he knew what the
Russians were doing and of course the

76
00:07:07,250 --> 00:07:12,860
entire start of the poem was definitely
an outcome of the space race many people

77
00:07:12,860 --> 00:07:18,949
felt that we should try to beat the
Russians to best solutions to do more

78
00:07:18,949 --> 00:07:24,169
than they were able to do and of course
in order to do that there was definitely

79
00:07:24,169 --> 00:07:29,210
a need for a relatively large space
booster so the army initially started to

80
00:07:29,210 --> 00:07:34,580
set on one it was later on improved to
the Saturn 1b this a much more powerful

81
00:07:34,580 --> 00:07:40,940
second stage which in a way you sweetie
the third stage of the Saturn 5 and then

82
00:07:40,940 --> 00:07:45,349
of course I said on five was in a very
completely new development but from all

83
00:07:45,349 --> 00:07:49,479
had laid the groundwork he had a
management team that could

84
00:07:49,479 --> 00:07:56,090
handle all the poll problems and I would
also like to point out that this entire

85
00:07:56,090 --> 00:08:00,710
project of course was really a
nationwide project many major

86
00:08:00,710 --> 00:08:07,520
contractors were involved and without
the help and also the training and the

87
00:08:07,520 --> 00:08:11,690
schooling of these contact us it would
not have been a successful form and

88
00:08:11,690 --> 00:08:17,470
again from bounce or the need for all
these things he laid the groundwork to

89
00:08:17,470 --> 00:08:23,150
prepare for all these necessary
preparations and I think that was a big

90
00:08:23,150 --> 00:08:27,010
part for the success of the program

91

00:08:29,470 --> 00:08:34,390

I personally and I can only speak for myself I was really not all that much

92

00:08:34,390 --> 00:08:40,240

affected by all these other pogrom problems of course I knew about it but

93

00:08:40,240 --> 00:08:45,100

we were all so busy preparing for the lunar landing that we basically had no

94

00:08:45,100 --> 00:08:50,530

time to very too much about these other problems being you that this project had

95

00:08:50,530 --> 00:08:56,260

to be taken to a final successful end and so we really put all our efforts all

96

00:08:56,260 --> 00:09:02,920

our hours of work into the solution of the problems which still existed and

97

00:09:02,920 --> 00:09:08,230

again I think we have to give from bond credit that he maintained the spirit

98

00:09:08,230 --> 00:09:14,800

that he has a team together in spite of major problems you probably have talked

99

00:09:14,800 --> 00:09:19,330

already in other sessions about the Apollo Fire which of course was a very

100

00:09:19,330 --> 00:09:25,600

big problem in the entire project and there exists at a great danger that the

101

00:09:25,600 --> 00:09:30,550
entire project might still have to be
cancelled because other problems existed

102
00:09:30,550 --> 00:09:36,310
like the Vietnam War that was going on
they require tremendous funding and of

103
00:09:36,310 --> 00:09:42,240
course the proto fire also increased
satellite cost of the Apollo program

104
00:09:42,240 --> 00:09:48,310
considerable changes had to be made
again from bond saw the need not only to

105
00:09:48,310 --> 00:09:52,180
make the changes on our own launch
vehicle which in the way was really not

106
00:09:52,180 --> 00:09:57,640
involved is a fire and he made his
deputy ever holidays available to work

107
00:09:57,640 --> 00:10:02,440
with North American and with a manned
spacecraft Center to solve the existing

108
00:10:02,440 --> 00:10:07,630
problems so for bond was not limiting
his effort only to the launch vehicle

109
00:10:07,630 --> 00:10:13,300
which was really his responsibility but
he again saw the need that the entire

110
00:10:13,300 --> 00:10:19,060
program has to be supported and he
provided the support and besides these

111

00:10:19,060 --> 00:10:23,740

of course also a consumer a number of
our people but actually quality control

112

00:10:23,740 --> 00:10:28,930

people were involved in order to solve
this problem of course from all I think

113

00:10:28,930 --> 00:10:35,440

he was a good family head so he was even
always concerned that he couldn't spend

114

00:10:35,440 --> 00:10:40,150

as much time as his family as he really
would have liked to do but he saw the

115

00:10:40,150 --> 00:10:45,959

need that the program the project
you nearly required his full support and

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00:10:45,959 --> 00:10:51,129

Fontbonne also varied quite a bit about
the people he was for example the one

117

00:10:51,129 --> 00:10:57,879

who installed the Marshall picnic he was
a one who established the local

118

00:10:57,879 --> 00:11:02,739

University he which today is of course
the University of Alabama in answer in

119

00:11:02,739 --> 00:11:08,980

those days it was just a very small sub
branch of the University in Tuscaloosa

120

00:11:08,980 --> 00:11:14,259

but he saw the need that his employees
on the one side needed additional

121

00:11:14,259 --> 00:11:22,379
schooling and he also wanted to provide
for our kids this educational capability

122
00:11:22,379 --> 00:11:28,179
from born also of course was quite
active in all civic affairs here so he

123
00:11:28,179 --> 00:11:34,119
was not only a good team leader for the
technical activities but he also saw the

124
00:11:34,119 --> 00:11:39,749
human needs that are connected with such
a major project

125
00:11:43,000 --> 00:11:48,570
I personally think mankind will
eventually land on Mars we will

126
00:11:48,570 --> 00:11:54,310
eventually settle not necessary their
planets but some of the major moons

127
00:11:54,310 --> 00:12:03,060
there are some moons around Jupiter
which might be suitable for a human

128
00:12:03,060 --> 00:12:09,070
occupation in a way and I personally am
convinced that mankind is moving in that

129
00:12:09,070 --> 00:12:16,120
area we are not only husband as the old
rocket pioneer the Russian Ziolkowski

130
00:12:16,120 --> 00:12:23,680
said the earth is a cradle of mankind
but you cannot spend your entire life in

131

00:12:23,680 --> 00:12:28,150

the crater you have to move out of the crater and I personally more convinced

132

00:12:28,150 --> 00:12:33,160

we are going to do that and of course the Apollo program is a real good start

133

00:12:33,160 --> 00:12:39,160

for this move into the realms of initially of course just a solar system

134

00:12:39,160 --> 00:12:44,230

I think it will take many many generations before we move with men

135

00:12:44,230 --> 00:12:48,540

pee-yew on beyond the solar system

136

00:12:50,570 --> 00:12:57,240

I am convinced it is biggest step that mankind has ever taken

137

00:12:57,240 --> 00:13:04,389

in the development of cereals as our major events may have taken place but

138

00:13:04,389 --> 00:13:10,179

controlled by mankind it is a first biggest step and although I believe that

139

00:13:10,179 --> 00:13:15,279

we eventually are going to move on I think it will be the big step for many

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00:13:15,279 --> 00:13:20,050

many years to come I personally don't think I see the return to the moon in my

141

00:13:20,050 --> 00:13:29,529

lifetime I don't think I see land man
landing on Mars in my lifetime and so in

142

00:13:29,529 --> 00:13:36,220
my own career that was needed to
highlight this was a high point and as I

143

00:13:36,220 --> 00:13:40,269
said I think it will be the high point
for all of mankind for many years to

144

00:13:40,269 --> 00:13:47,110
come so it was really a big leap for
mankind as Neil Armstrong said we have

145

00:13:47,110 --> 00:13:51,429
really learned an awful lot about the
earth if you can observe the earth from

146

00:13:51,429 --> 00:13:57,249
orbit you can see quite a bit more than
if you limit all your observations here

147

00:13:57,249 --> 00:14:02,110
only to earthbound activities so we
understand the earth much better we

148

00:14:02,110 --> 00:14:06,429
understand the effect of the Sun the
sun's radiation on the Earth's

149

00:14:06,429 --> 00:14:12,579
atmosphere which is really tremendous
which is much more than effective most

150

00:14:12,579 --> 00:14:18,490
people had expected initially in fact I
personally am convinced that the

151

00:14:18,490 --> 00:14:24,160

breakdown of the Russian Empire is in a way due to our communication technology

152

00:14:24,160 --> 00:14:28,959

so people on the other side particularly in East Germany they saw what was going

153

00:14:28,959 --> 00:14:34,149

on on the other side and even a wall which had been built could not prevent

154

00:14:34,149 --> 00:14:38,639

this information from being exchanged because if satellites were in orbit

155

00:14:38,639 --> 00:14:44,559

anyone could get the information from the satellites and I think that's to a

156

00:14:44,559 --> 00:14:49,480

degree what led to the breakdown of the Russian Empire they just could not keep

157

00:14:49,480 --> 00:14:54,369

this information of a live the way we do business it could not keep it away