1
00:00:09,690 --> 00:00:08,280
engineers of the Boeing Company and the

2
00:00:11,909 --> 00:00:09,700
National Aeronautics and Space

3
00:00:14,100 --> 00:00:11,919
Administration are making final

4
00:00:19,230 --> 00:00:14,110
preparations to launch one of a series

5
00:00:21,750 --> 00:00:19,240
of lunar orbiters the satellites primary

6
00:00:26,429 --> 00:00:21,760
mission is to photograph landing areas

7
00:00:28,380 --> 00:00:26,439
on the moon for America's astronauts an

8
00:00:53,369 --> 00:00:28,390
atlas aegina booster will launch the

9
00:00:58,599 --> 00:00:56,290
when orbital speed and altitude are

10
00:01:01,569 --> 00:00:58,609
achieved the Atlas booster and nose

11
00:01:03,759 --> 00:01:01,579
shroud will separate and the Agena will

12
00:01:06,639 --> 00:01:03,769
fire to place itself and the lunar

13
00:01:09,130 --> 00:01:06,649

orbiter into a 100 mile high orbit

14
00:01:11,590 --> 00:01:09,140
around the earth they must travel to the

15
00:01:14,380 --> 00:01:11,600
exact point in space from which aegina

16
00:01:16,749 --> 00:01:14,390
can put the lunar orbiter on its path to

17
00:01:20,800 --> 00:01:16,759
the moon when this point is reached

18
00:01:23,590 --> 00:01:20,810
aegina fires again soon after burnout

19
00:01:27,309 --> 00:01:23,600
aegina separates and the 850-pound

20
00:01:30,340 --> 00:01:27,319
orbiter will be on its way now speeding

21
00:01:33,010 --> 00:01:30,350
through space at 25,000 miles per hour

22
00:01:36,789 --> 00:01:33,020
the vehicle will extend its two-way

23
00:01:39,460 --> 00:01:36,799
earth communication antennas and solar

24
00:01:41,740 --> 00:01:39,470
panels will open to capture and convert

25
00:01:45,190 --> 00:01:41,750
the sun's energy into electrical power

26
00:01:47,529 --> 00:01:45,200
for orbiters systems tiny attitude

27
00:01:49,419 --> 00:01:47,539
control jets located on the corners of

28
00:01:51,820 --> 00:01:49,429
the heat shield will be fired to

29
00:01:55,060 --> 00:01:51,830
position the vehicle to aim its solar

30
00:01:57,370 --> 00:01:55,070
panels toward the Sun and aim its

31
00:02:01,270 --> 00:01:57,380
tracker for a fix on its navigational

32
00:02:03,819 --> 00:02:01,280
star canovas after 15 hours of flight

33
00:02:06,399 --> 00:02:03,829
toward the moon lunar orbiter will fire

34
00:02:09,430 --> 00:02:06,409
its velocity control rocket to make a

35
00:02:11,500 --> 00:02:09,440
mid-course correction later in the

36
00:02:13,690 --> 00:02:11,510
journey as the orbiter gets closer to

37
00:02:16,270 --> 00:02:13,700
the moon the velocity control rocket

38
00:02:19,509 --> 00:02:16,280

will be fired again to slow the

39
00:02:21,789 --> 00:02:19,519
spacecraft this will serve to trap the

40
00:02:24,490 --> 00:02:21,799
spacecraft in an off-center orbit around

41
00:02:27,630 --> 00:02:24,500
the moon where it will circle from four

42
00:02:29,920 --> 00:02:27,640
to six days by tracking this orbit

43
00:02:32,620 --> 00:02:29,930
scientists on earth will obtain their

44
00:02:34,449 --> 00:02:32,630
first precise information about the

45
00:02:38,020 --> 00:02:34,459
effects of the moon's gravitational

46
00:02:40,300 --> 00:02:38,030
field on the spacecraft with this

47
00:02:43,120 --> 00:02:40,310
knowledge they will be able to lower the

48
00:02:45,539 --> 00:02:43,130
vehicles borbet to a close 28 miles for

49
00:02:47,650 --> 00:02:45,549
photography of the moon's surface

50
00:02:49,539 --> 00:02:47,660
control of the spacecraft is

51
00:02:52,300 --> 00:02:49,549
accomplished through instructions stored

52
00:02:55,330 --> 00:02:52,310
in an on-board computer Mission Control

53
00:02:58,210 --> 00:02:55,340
personnel can radio new instructions for

54
00:03:01,479 --> 00:02:58,220
storage or can bypass the computer to

55
00:03:02,530 --> 00:03:01,489
control the orbiter directly operating

56
00:03:05,199 --> 00:03:02,540
on these instruct

57
00:03:07,449 --> 00:03:05,209
the lunar orbiter will turn itself to

58
00:03:11,140 --> 00:03:07,459
aim its two camera lenses downward

59
00:03:13,690 --> 00:03:11,150
during picture-taking marbles then as it

60
00:03:17,020 --> 00:03:13,700
soars over the desired areas it will

61
00:03:19,899 --> 00:03:17,030
take a series of pictures one lens will

62
00:03:22,660 --> 00:03:19,909
cover an area of 25 square miles and

63
00:03:24,910 --> 00:03:22,670

record objects as small as a card table

64
00:03:28,440 --> 00:03:24,920
the other will make overlapping

65
00:03:31,270 --> 00:03:28,450
photographs of 440 square mile sections

66
00:03:34,629 --> 00:03:31,280
during its mission the lunar orbiter

67
00:03:38,530 --> 00:03:34,639
will take 160 pairs of pictures while

68
00:03:40,390 --> 00:03:38,540
filming 12,000 square miles an area as

69
00:03:43,300 --> 00:03:40,400
large as the combined area of

70
00:03:45,789 --> 00:03:43,310
Massachusetts and Connecticut while

71
00:03:48,190 --> 00:03:45,799
photography is in progress the camera

72
00:03:52,119 --> 00:03:48,200
will begin to automatically develop and

73
00:03:54,580 --> 00:03:52,129
store the exposed film following each

74
00:03:57,420 --> 00:03:54,590
series of exposures the orbiter will

75
00:03:59,979 --> 00:03:57,430
again aim its solar panels at the Sun

76
00:04:02,170 --> 00:03:59,989
when picture transmission takes place

77
00:04:04,929 --> 00:04:02,180
the stored images will be sent in the

78
00:04:08,619 --> 00:04:04,939
form of an electronic signal produced by

79
00:04:11,500 --> 00:04:08,629
a light scanning the stored negatives at

80
00:04:14,949 --> 00:04:11,510
Goldstone near an abandoned gold mine in

81
00:04:17,080 --> 00:04:14,959
California's Mojave Desert this 85 foot

82
00:04:20,229 --> 00:04:17,090
diameter antenna is the communication

83
00:04:23,020 --> 00:04:20,239
link with the lunar orbiter it's similar

84
00:04:26,320 --> 00:04:23,030
to two other antennas in australia and

85
00:04:29,680 --> 00:04:26,330
spain surrounding hills protected from

86
00:04:31,899 --> 00:04:29,690
random radio signals the antenna control

87
00:04:34,659 --> 00:04:31,909
team tracks the orbiter with signals the

88
00:04:36,790 --> 00:04:34,669

orbiter sent back to earth the team also

89
00:04:40,240 --> 00:04:36,800
directs the flow of signals from the

90
00:04:43,000 --> 00:04:40,250
antenna to the orbiter this equipment

91
00:04:44,950 --> 00:04:43,010
generates signals to the spacecraft the

92
00:04:47,140 --> 00:04:44,960
orbiters computer responds to the

93
00:04:50,620 --> 00:04:47,150
signals and controls the orbiter

94
00:04:53,909 --> 00:04:50,630
accordingly these men are the last human

95
00:04:56,620 --> 00:04:53,919
link between Earth and the spacecraft

96
00:04:59,110 --> 00:04:56,630
incoming photographic information from

97
00:05:01,360 --> 00:04:59,120
the orbiter is fed into this equipment

98
00:05:03,670 --> 00:05:01,370
where electronic wizardry converts the

99
00:05:07,029 --> 00:05:03,680
electronic signal to a pinpoint of light

100
00:05:10,120 --> 00:05:07,039
of varying intensity the tiny beam

101
00:05:14,019 --> 00:05:10,130
sweeps back and forth exposing a moving

102
00:05:16,480 --> 00:05:14,029
strip of 35 millimeter film when

103
00:05:19,330 --> 00:05:16,490
processed the resulting negative show

104
00:05:21,760 --> 00:05:19,340
was what the orbiter's camera saw at the

105
00:05:24,400 --> 00:05:21,770
receiving station technicians will

106
00:05:26,800 --> 00:05:24,410
process and study samples of the exposed

107
00:05:28,870 --> 00:05:26,810
negative to ensure that signals are

108
00:05:32,260 --> 00:05:28,880
coming back properly and that the

109
00:05:34,990 --> 00:05:32,270
orbiters camera is correctly set most of

110
00:05:37,570 --> 00:05:35,000
the 18 miles of film will be sent to a

111
00:05:39,430 --> 00:05:37,580
reassembly facility where the strip's

112
00:05:41,830 --> 00:05:39,440
will be developed and arranged into

113
00:05:44,260 --> 00:05:41,840

large negatives prints of these

114
00:05:48,850 --> 00:05:44,270
negatives will form the basis for lunar

115
00:05:51,689 --> 00:05:48,860
maps although direct communication with

116
00:05:54,399 --> 00:05:51,699
the lunar orbiter is via Goldstone or

117
00:05:56,589 --> 00:05:54,409
Australia or Spain the mission is

118
00:05:59,529 --> 00:05:56,599
directed from the spaceflight operations

119
00:06:03,339 --> 00:05:59,539
facility in Pasadena sitting side by

120
00:06:06,219 --> 00:06:03,349
side NASA and Boeing engineers evaluate

121
00:06:10,240 --> 00:06:06,229
and act upon information received from

122
00:06:12,460 --> 00:06:10,250
the antennas the information comes to

123
00:06:14,980 --> 00:06:12,470
the Pasadena computer center and is

124
00:06:18,159 --> 00:06:14,990
translated into a form understandable to

125
00:06:20,469 --> 00:06:18,169
engineers they use it to determine the

126
00:06:23,620 --> 00:06:20,479
lunar orbiters velocity attitude

127
00:06:26,409 --> 00:06:23,630
temperature power situation and some 50

128
00:06:29,560 --> 00:06:26,419
other conditions this automatic drawing

129
00:06:31,629 --> 00:06:29,570
machine charts the data other engineers

130
00:06:34,600 --> 00:06:31,639
keep track of the orbiters location and

131
00:06:37,029 --> 00:06:34,610
direction they plot course changes and

132
00:06:39,730 --> 00:06:37,039
calculate when and how the spacecraft

133
00:06:41,709 --> 00:06:39,740
should be maneuvered this control room

134
00:06:44,439 --> 00:06:41,719
is the nerve center of the entire

135
00:06:47,050 --> 00:06:44,449
mission the operations director and his

136
00:06:48,700 --> 00:06:47,060
assistant are in voice contact with key

137
00:06:51,430 --> 00:06:48,710
personnel at those installations

138
00:06:54,279 --> 00:06:51,440

throughout the world which gather and

139
00:06:56,200 --> 00:06:54,289
record flight information engineers here

140
00:06:59,740 --> 00:06:56,210
at Pasadena interpret the information

141
00:07:03,120 --> 00:06:59,750
and the operations directors use the

142
00:07:05,589 --> 00:07:03,130
results to make final flight decisions

143
00:07:08,170 --> 00:07:05,599
when it's photographic mission has been

144
00:07:10,589 --> 00:07:08,180
completed in about a month the lunar

145
00:07:12,939 --> 00:07:10,599
orbiter will continue to circle the moon

146
00:07:15,100 --> 00:07:12,949
providing information about micro

147
00:07:17,860 --> 00:07:15,110
meteoroids and radiation in the moon's

148
00:07:20,860 --> 00:07:17,870
vicinity this data along with the