1
00:00:00,909 --> 00:00:06,089
NARRATOR: Angled glass and thick concrete
walls reinforced with steel gave the Launch

2
00:00:06,089 --> 00:00:12,080
Control Center an imposing, unique look. But
it was the brains of the Launch Control Center

3
00:00:12,080 --> 00:00:18,510
that made it famous as the only facility in
the world smart enough to launch a 36-story

4
00:00:18,510 --> 00:00:25,510
rocket and three astronauts off the planet
so they could set their feet on another world.

5
00:00:32,900 --> 00:00:39,100
Best known by its acronym, the LCC at NASA's
Kennedy Space Center in Florida would go on

6
00:00:39,100 --> 00:00:45,660
to operate as the nerve center for every launch
carrying a crew through Apollo, NASA's first

7
00:00:45,660 --> 00:00:52,660
space station program called Skylab, the Apollo-Soyuz
mission with the Soviet Union and then the

8
00:00:52,680 --> 00:00:57,199
30 years and more than 130 launches of the
space shuttle.

9
00:00:57,199 --> 00:01:05,059
BOB SIECK Back in the 60s, during the Apollo
program, this was the hub, as it were, the

10
00:01:05,060 --> 00:01:11,420
central control center. This was the control
room for all the activity associated with

11
00:01:11,420 --> 00:01:19,920
the launch facility, the rocket and the spacecraft
and the payloads for the Apollo missions.

12
00:01:20,290 --> 00:01:26,010
NARRATOR: The Launch Control Center was built
around one thing: launching men to the moon.

13
00:01:26,010 --> 00:01:31,640
The rocket that ended up carrying out that
mission, the Saturn V, was the largest ever

14
00:01:31,640 --> 00:01:37,710
built, and far more powerful and complicated
than anything that had come before it.

15
00:01:37,710 --> 00:01:44,210
Up until the Saturn V, the launch teams for
Redstone, Atlas and Titan II rockets fit in

16
00:01:44,210 --> 00:01:48,170
a single room at the base of the launch pad
called a blockhouse.

17
00:01:48,170 --> 00:01:55,590
PETE MINDERMAN: A blockhouse might have a thousand square feet. So when people had a problem,

18
00:01:55,630 --> 00:02:01,320
and believe me, we had problems and problems
and problems and we learned from every one

19
00:02:01,320 --> 00:02:09,940
of them, we could get everybody that needed
to contribute to the management decision together

20
00:02:09,950 --> 00:02:16,040
by gathering around one console and make the
decisions that needed to be made.

21

00:02:16,040 --> 00:02:22,330
When we came through to 39 and had a much
bigger management structure, bigger organization,

22
00:02:22,330 --> 00:02:29,330
much more complicated hardware, we had to
come up with a new concept.

23
00:02:30,570 --> 00:02:36,030
NARRATOR: The task for the LCC's designers
was complicated by the fact that when the

24
00:02:36,030 --> 00:02:40,670
structure was designed and built, NASA had
not settled on the way they would get to the

25
00:02:40,670 --> 00:02:45,790
moon. There were still heated debates about
everything from how many rockets would be

26
00:02:45,790 --> 00:02:51,400
needed for a single lunar landing, to where
spacecraft would rendezvous in space.

27
00:02:51,400 --> 00:02:54,010
MINDERMAN:
We had to come up with a concept that would

28
00:02:54,010 --> 00:02:57,410
work no matter what path they finally chose.

29
00:02:57,410 --> 00:03:02,930
NARRATOR: The LCC was the first launch control
center that was not within the launch pad's

30
00:03:02,930 --> 00:03:08,870
perimeter. Instead, the LCC was built three
miles from where the Saturn V's massive

31
00:03:08,870 --> 00:03:15,870

F1 engines would ignite in a thunder of 7.5
million pounds of thrust.

32
00:03:18,420 --> 00:03:23,530
The building's architectural focal point is
a set of windows about two-stories tall that

33
00:03:23,530 --> 00:03:30,530
run the length of the building facing Launch
Complexes 39A and 39B. >>> Metal shutters

34
00:03:30,730 --> 00:03:33,790
were installed over the windows for protection.

35
00:03:33,790 --> 00:03:39,050
MINDERMAN: The shutters were there to close
because we were afraid the acoustic energy

36
00:03:39,050 --> 00:03:46,050
would be so great when we fired the engines
of the Saturn V that it would just break the

37
00:03:46,050 --> 00:03:47,400
glass of the windows.

38
00:03:47,569 --> 00:03:53,330
NARRATOR: The heart of the LCC lies in four
large areas on the third floor called the

39
00:03:53,330 --> 00:04:00,280
firing rooms. Miles and miles of cables and
wires arrayed throughout Kennedy Space Center's

40
00:04:00,280 --> 00:04:08,420
144,000 acres end here. As spacecraft and
rockets were prepared, signals from hangers,

41
00:04:08,430 --> 00:04:13,240
assembly rooms and the launch pad were sent
to the LCC.

42
00:04:13,240 --> 00:04:18,150
Though identical, the rooms would be used
differently during a mission to cater to specific

43
00:04:18,150 --> 00:04:24,470
team needs. Each one would be used as the
central room for certain launches, and support

44
00:04:24,470 --> 00:04:25,460
rooms for others. >>>

45
00:04:25,460 --> 00:04:33,760
LEINBACH: I worked in the LCC for over 20
years, almost 25 years and when I first took

46
00:04:33,760 --> 00:04:42,340
a job there we had dial phones, we had rotary
phones and when we got our first push-button

47
00:04:42,340 --> 00:04:47,190
phones, that was a big deal. Fax machines,
we didn't have any fax machines in the firing

48
00:04:47,190 --> 00:04:52,240
room until the late-80s. So technology really changed a lot.

49
00:04:52,250 --> 00:04:58,350
The thing that didn't change was the operating
system for processing the shuttle. The guys

50
00:04:58,350 --> 00:05:03,910
that worked shuttle, they had to learn that
operating language and learned it very well

51
00:05:03,910 --> 00:05:10,210
obviously, but it wasn't applicable to the
outside world. It was a unique application

52

00:05:10,210 --> 00:05:11,820
just for shuttle processing.

53
00:05:11,820 --> 00:05:17,530
NARRATOR: More than 100 engineers filled the
firing rooms on launch day, each one working

54
00:05:17,530 --> 00:05:24,030
a specific system or task as part of a carefully
choreographed team that would not let a crew

55
00:05:24,030 --> 00:05:29,090
of astronauts lift off until the machinery
of spaceflight was ready.

56
00:05:29,090 --> 00:05:33,430
Diligence and discipline were the watch words
for anyone who

57
00:05:33,430 --> 00:05:35,300
dreamt of working in a firing room.

58
00:05:35,300 --> 00:05:39,389
SIECK: The one thing that we were it was drilled
into it us by the management and by the

59
00:05:39,389 --> 00:05:45,020
operations folks was that when you came into
this room, you were in a different environment.

60
00:05:45,020 --> 00:05:51,540
There was no games in here, there was no pushing
and shoving. There was no joking. This was,

61
00:05:51,540 --> 00:05:58,240
'important things are done in this room and
your focus has to be on your responsibility'.

62
00:05:58,240 --> 00:06:01,340
It was discipline, discipline, discipline.

63
00:06:01,340 --> 00:06:09,860
LEINBACH: What it took was not just a complete knowledge of that system, but it took a dedication

64
00:06:09,860 --> 00:06:15,680
to be able to feel the conviction in your heart to go against the grain if you had to

65
00:06:15,680 --> 00:06:20,780
or call a no go if you had to, not to be a wallflower but stand up for that system or

66
00:06:20,780 --> 00:06:23,880
in the safety world or whatever it might be.

67
00:06:23,880 --> 00:06:29,120
It took a combination of technical smarts and a dedication and conviction to the safety

68
00:06:29,120 --> 00:06:32,990
of the crew and the vehicles to sit in that prime room.

69
00:06:32,990 --> 00:06:37,840
NARRATOR: The architecture inside the firing room featured raised platforms at the front

70
00:06:37,840 --> 00:06:43,580
of the room lowering to a set of horseshoe cabinets was not done by accident or even

71
00:06:43,580 --> 00:06:44,500
by necessity.

72
00:06:44,500 --> 00:06:51,500
SIECK: This again goes back to the heritage of the human spaceflight and launch business

73

00:06:51,500 --> 00:07:00,060
and it started over on the Cape side and the launches from the blockhouses. It was to remind

74
00:07:00,070 --> 00:07:07,070
people in the blockhouses that the test conductors and the launch directors were in charge, so

75
00:07:07,120 --> 00:07:15,440
their consoles were elevated relative to the systems engineers whose consoles were on the

76
00:07:15,449 --> 00:07:19,840
floor, as it were, who executed the procedures.

77
00:07:19,840 --> 00:07:25,620
NARRATOR: Designers carried the tradition over to the new LCC, which was much larger

78
00:07:25,620 --> 00:07:27,520
than previous control rooms.

79
00:07:27,520 --> 00:07:34,050
SIECK: One of the things we observed as systems engineers was the test conductors and launch

80
00:07:34,050 --> 00:07:40,610
directors kept getting higher and higher relative to the floor where we floor workers worked.

81
00:07:40,610 --> 00:07:45,250
NARRATOR: The rooms were staffed most of the time during program

82
00:07:45,250 --> 00:07:46,680
the Apollo and early shuttle years.

83
00:07:46,680 --> 00:07:50,580
SIECK: A normal day was a day and a night, usually.

84
00:07:50,580 --> 00:07:55,490
There was always at least a test conductor
in here plus some facilities and support.

85
00:07:55,490 --> 00:08:02,740
If you powered up any stage of the Saturn
V rocket and if the spacecraft was powered

86
00:08:02,740 --> 00:08:09,160
up, then you added people to the room. If
it was all up with the systems all up, then

87
00:08:09,160 --> 00:08:12,000
you would have 50, 75 people in this room.

88
00:08:12,000 --> 00:08:16,770
NARRATOR: The rooms also featured areas in
each corner where people not associated with

89
00:08:16,770 --> 00:08:22,550
the launch could watch the action unfold without
interfering or distracting the controllers.

90
00:08:22,550 --> 00:08:28,830
SIECK: We called them the management rooms
on each side of the test conductor and launch

91
00:08:28,830 --> 00:08:36,179
director console and the management that came
in were not part of the execution of the procedures

92
00:08:36,179 --> 00:08:41,990
during a launch countdown, but they didn't
have the ability to connect directly with the astronauts

93
00:08:41,990 --> 00:08:48,990
or the engineers. So they would not be a distraction
for those of us on the floor.

94
00:08:48,990 --> 00:08:55,300
LEINBACH: I think it was a very insightful
decision way back when to have VIPs in the

95
00:08:55,300 --> 00:09:01,610
room, available for an extremely tough call,
if necessary, but keep them away from the

96
00:09:01,610 --> 00:09:05,740
launch team. Let us get the vehicle ready
to fly and then turn it over to the flight

97
00:09:05,740 --> 00:09:11,980
control team in Houston to execute the mission.So if we got into a condition where we

98
00:09:11,980 --> 00:09:17,649
were outside the launch commit criteria and
even outside the bounds, the authority of

99
00:09:17,649 --> 00:09:22,319
mission management team which was created
after Challenger, we could turn to the administrator

100
00:09:22,319 --> 00:09:24,439
and ask his opinion.

101
00:09:24,439 --> 00:09:29,790
NARRATOR: Although it was designed for one
kind of rocket, the LCC has proven adaptable

102
00:09:29,790 --> 00:09:36,309
to the extraordinary needs of rockets and
spacecraft carrying humans into space. Following

103
00:09:36,309 --> 00:09:42,679
the landmark successes of launching nine missions
to the moon, controllers in the LCC launched

104
00:09:42,679 --> 00:09:49,679

America's first space station, Skylab, along
with three crews to operate it in orbit.

105
00:09:49,720 --> 00:09:55,389
The launch of the first international cooperation
mission, the Apollo-Soyuz Test Project, was

106
00:09:55,389 --> 00:10:01,490
also conducted in the LCC, where the liftoff
was carefully timed so the two spacecraft

107
00:10:01,490 --> 00:10:07,459
launched from different parts of the world
would link in orbit.

108
00:10:07,459 --> 00:10:14,459
After the Apollo and Saturn V programs ended,
NASA modified the LCC for a dynamic new spacecraft,

109
00:10:14,850 --> 00:10:16,649
the space shuttle.

110
00:10:16,649 --> 00:10:22,319
The LCC was updated to meet the demands of
the new spacecraft, but it kept its character.

111
00:10:22,319 --> 00:10:32,099
SIECK: It's a reminder of Yankee ingenuity.
The people that laid out the whole launch

112
00:10:32,100 --> 00:10:37,540
control center here, they did that in the
early '60s and they tried to get the best

113
00:10:37,540 --> 00:10:44,540
they could to think about the future and the
demands of this and in hindsight they did

114
00:10:44,580 --> 00:10:47,660
it exactly right.

115
00:10:47,679 --> 00:10:55,479
LEINBACH- When I started out in the mid- 80s,
we still had the Apollo consoles in the control

116
00:10:55,480 --> 00:11:02,029
rooms, those old bluish consoles, you know,
steel, that were made for Apollo so we processed

117
00:11:02,029 --> 00:11:08,720
and launched, gosh, the first two-thirds of
the shuttle program using those old consoles

118
00:11:08,720 --> 00:11:16,220
and then along in the early 2000s Firing room
4 got upgraded as part of a system to upgrade

119
00:11:16,220 --> 00:11:21,139
the operating system and we wanted to get
into a more advanced operating system and

120
00:11:21,139 --> 00:11:25,839
the legacy of that program was the consoles
got updated so they looked real nice but the

121
00:11:25,839 --> 00:11:31,149
operating system, the guts of the actual computer
program never did change. Very few people

122
00:11:31,149 --> 00:11:37,009
know that. So it looks good on TV, but it
was the old operating system.

123
00:11:37,009 --> 00:11:43,730
So firing room 4, when we got that up and
running everybody felt good, brand new room.

124
00:11:43,730 --> 00:11:45,929
It felt good coming to work.

125
00:11:48,180 --> 00:11:51,839
NARRATOR: What happened in the LCC's firing rooms inspired millions

126
00:11:51,839 --> 00:11:57,559
around the world. With the center built and
outfitted with computers and digital networks,

127
00:11:57,559 --> 00:12:02,970
a staff unlike any other could focus on the
rockets and spacecraft that would launch humans