ted States

1
00:00:01,910 --> 00:00:05,320
KEVIN PANIK, NASA Pad Manager: The complexity, you know, the systems we brought together in this

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00:00:05,320 --> 00:00:12,840
one place to do something that very few places in the world do, you know, launch humans to

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00:00:12,840 --> 00:00:21,430
low-Earth orbit, you know, and hopefully with the new program, to the farther reaches of space.

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00:00:21,430 --> 00:00:25,760
So when you go to a system or place like that, you can't help but be overwhelmed.

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00:00:25,760 --> 00:00:33,460
NARRATOR: Every space shuttle mission began with a fiery liftoff from Launch Complex 39 at

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00:00:33,460 --> 00:00:38,290
NASA's Kennedy Space Center. The launch complex had two pads, Pad A and Pad B.

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00:00:38,290 --> 00:00:43,540
If the launch pads demonstrated anything, it is that complex is the right word for the two pad

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00:00:43,540 --> 00:00:49,260
areas that handled the shuttles for about a month before they made their trips into space.

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00:00:49,260 --> 00:00:53,810
Outfitted with everything a spacecraft and its crew would need to take the final leap into

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00:00:53,810 --> 00:00:59,640
space, the pads handled fueling duties and crew support, and held precision machinery for a

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00:00:59,640 --> 00:01:01,910
range of payloads.

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00:01:01,910 --> 00:01:06,910
Its grated floors and gray paint, along with armored boxes for instruments, telephones and

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00:01:06,910 --> 00:01:11,720

elevators, revealed a style more Spartan than space age.

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00:01:11,720 --> 00:01:14,110
PANIK: You always find something that you didn't know.

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00:01:14,110 --> 00:01:20,170
You've got so many systems, you've got system level experts and technicians that have been out

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00:01:20,170 --> 00:01:27,490
there for so many years, dedicated, essentially, many of them their entire careers out there.

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00:01:27,490 --> 00:01:32,510
Even though, yeah, it's a lot of steel, a lot of wires and lights and tubing and that kind of

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00:01:32,510 --> 00:01:39,960
stuff, it does interface with, it interfaces to a flight vehicle, you know, so you always have

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00:01:39,960 --> 00:01:43,940
those complex interfaces and there's always something to learn. It may look kind of Spartan,

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00:01:43,940 --> 00:01:46,790
but it has its hidden treasures.

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00:01:46,790 --> 00:01:50,510
NARRATOR: The launch pad and all its fittings were built to withstand the brute force of a

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00:01:50,510 --> 00:01:53,930
launch, which would rattle the pad with intense fire, corrosive exhaust and

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00:01:53,930 --> 00:01:58,590
thunderous sound waves.

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00:01:58,590 --> 00:02:05,750
PANIK: It gets tested. Let's put it that way. There's a tremendous of force that gets placed

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00:02:05,750 --> 00:02:14,650
at liftoff on the structure, on the mobile launch platform, the MLP, heat, acoustics.

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00:02:14,650 --> 00:02:20,320
NARRATOR: Each pad featured a shallow-sloped concrete pyramid about 40 feet high with a

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00:02:20,320 --> 00:02:25,890
flame trench carved through the middle to channel exhaust away during launch.

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00:02:25,890 --> 00:02:30,430
The launch pads were first built for the Saturn V rockets of the Apollo program.

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00:02:30,430 --> 00:02:35,280
Back then, the launch complex did not have any permanent service towers because the support

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00:02:35,280 --> 00:02:40,260
structure was on a mobile launch platform and traveled with the rocket to the pad.

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00:02:40,260 --> 00:02:44,580
PANIK: There's an element of the history, you know, to think back and to stand in places

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00:02:44,580 --> 00:02:51,700
where people were launched to the moon, that has a real place for me.

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00:02:51,700 --> 00:02:55,700
NARRATOR: For shuttle, a pair of support structures called a fixed service structure,

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00:02:55,700 --> 00:03:01,020
or FSS, and a rotating service structure, or RSS were built at the pad and would remain

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00:03:01,020 --> 00:03:07,240
there for all 30-years of flights. Both structures carried wiring and other infrastructure

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00:03:07,240 --> 00:03:12,280
needed to support and protect a space shuttle for weeks at a time.

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00:03:12,280 --> 00:03:16,340
A shuttle stack, meaning an orbiter attached to an external fuel tank and a pair of

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00:03:16,340 --> 00:03:21,780

solid rocket boosters, would move to the launch pad about a month before liftoff.

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00:03:21,780 --> 00:03:27,580
The shuttle was connected to networks of data cables, water lines and the fueling system.

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00:03:27,580 --> 00:03:32,530
PANIK: Unless you were out there when the workers and the engineers and the technicians

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00:03:32,530 --> 00:03:40,540
were out there, you really, it's hard to capture the elements of these people working together

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00:03:40,540 --> 00:03:48,380
as a team doing complex tasks, complex jobs with a vehicle there that is just, you know,

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00:03:48,380 --> 00:03:53,060
loaded with solid propellant, you know, it could be dangerous as heck, it really is,

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00:03:53,060 --> 00:03:59,020
I mean, and they did it routinely and made it safe.

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00:03:59,020 --> 00:04:03,210
NARRATOR: There's also a bathroom, complete with stainless steel fixtures instead of brittle

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00:04:03,210 --> 00:04:04,030
porcelain.

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00:04:04,030 --> 00:04:08,250
PANIK: When we do give some tours up there, or groups come up there,

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00:04:08,250 --> 00:04:11,200
I always point out that that's the last toilet on Earth.

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00:04:11,200 --> 00:04:15,610
NARRATOR: Before launch day, the RSS covered most of the shuttle and provided a

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00:04:15,610 --> 00:04:21,210
clean room that safely moved space probes, space station modules and even NASA's Hubble Space

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00:04:21,210 --> 00:04:25,840
Telescope into the shuttle's cargo bay without contaminating them.

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00:04:25,840 --> 00:04:31,050
Other parts of the launch pad gave workers access to most areas of the shuttle stack, which

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00:04:31,050 --> 00:04:36,110
stood up to 184 feet above the surface of the mobile launcher platform.

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00:04:36,110 --> 00:04:41,370
The launch pad was woven throughout with propellant lines, wiring and machinery.

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00:04:41,370 --> 00:04:45,610
PANIK: There's so many complex things out there that can literally kill you if you

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00:04:45,610 --> 00:04:53,740
do something wrong, or, not just yourself. You know, it could be devastating. And we do it

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00:04:53,740 --> 00:05:00,600
safely, routinely day in and day out, that's testament to the workforce, to what this nation

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00:05:00,600 --> 00:05:07,280
built from the Apollo era, learning through hard lessons.

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00:05:07,280 --> 00:05:11,770
NARRATOR: Launch day was also when most of the structures at the pad came to life, most by

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00:05:11,770 --> 00:05:17,630
remote control to keep people a safe distance away. The huge white spheres on either

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00:05:17,630 --> 00:05:23,670
side of the shuttle would pump super-cold liquid hydrogen and liquid oxygen into the shuttle's

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00:05:23,670 --> 00:05:27,740
external tank. Each propellant had to flow through long lines from the spheres about

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00:05:27,740 --> 00:05:29,440

a half mile from the shuttle.

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00:05:29,440 --> 00:05:36,770
PANIK: As you get closer to launch, things just kind of step up and you can feel it.

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00:05:36,770 --> 00:05:41,690
Just pure excitement really as you're getting closer.

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00:05:41,690 --> 00:05:45,190
NARRATOR: The last people at the pad on the launch day were the astronauts.

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00:05:45,190 --> 00:05:48,560
They headed into the "White Room", a kind of cramped locker room,

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00:05:48,560 --> 00:05:51,000
before boarding the shuttle.

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00:05:51,000 --> 00:05:55,640
With two and a half minutes to go, the gaseous oxygen vent arm and it white "beanie cap"

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00:05:55,640 --> 00:06:00,560
retracted from the top of the external tank, clearing the way for the launch.

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00:06:00,560 --> 00:06:05,250
About 16 seconds before launch, some 300,000 gallons of water poured onto the

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00:06:05,250 --> 00:06:10,170
launch pad. Though it might seem to be done to protect against the blazing fire,

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00:06:10,170 --> 00:06:14,120
the water was actually for sound suppression, to dampen the vibrations

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00:06:14,120 --> 00:06:17,360
produced by 7 million pounds of thrust.

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00:06:17,360 --> 00:06:21,990
The fire and thunder would produce a show unlike any other.

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00:06:21,990 --> 00:06:27,050
Voice of NASA Launch Commentator Mike Curie: Go for main engine start?we have main engine

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00:06:27,050 --> 00:06:36,270
start. Two, one?booster ignition and the final liftoff of Discovery, a tribute to the

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00:06:36,270 --> 00:06:40,300
dedication, hard work and pride of America's space shuttle team.

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00:06:40,300 --> 00:06:44,620
The shuttle has cleared the tower.

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00:06:44,620 --> 00:06:49,180
PANIK: Some of our teams would have to work late shift so you'd have to go home and watch it

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00:06:49,180 --> 00:06:54,500
from the river just like the other folks would or something like that which I

82
00:06:54,500 --> 00:06:58,240
actually kind of would enjoy, you know, if I couldn't make it into the center

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00:06:58,240 --> 00:07:02,720
in time, you know, just being out there with the general public and everything like

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00:07:02,720 --> 00:07:08,950
that and just sit back and watch the kids and people enjoy a beautiful launch,

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00:07:08,950 --> 00:07:13,150
it was part of my joy.

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00:07:13,150 --> 00:07:16,860
NARRATOR: Now that the space shuttle is retired, the pads are being prepared for

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00:07:16,860 --> 00:07:18,670
another transition.

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00:07:18,670 --> 00:07:23,490

The structures that marked the space shuttle era have been removed from Launch Pad 39B

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00:07:23,490 --> 00:07:27,160
so it can handle several different types of launchers that are expected to make up

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00:07:27,160 --> 00:07:30,900
the next generation of space exploration.

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00:07:30,900 --> 00:07:36,390
Pad 39A, the starting point for some of NASA's most famous flights including Apollo 11