



1  
00:00:00,000 --> 00:00:10,010  
[ Music ]

2  
00:00:10,510 --> 00:00:12,929  
>> NASA, the National  
Aeronautics

3  
00:00:12,929 --> 00:00:16,599  
and Space Administration  
presents Aeronautics

4  
00:00:16,599 --> 00:00:20,645  
and Space Report.

5  
00:00:24,983 --> 00:00:35,493  
[ Music ]

6  
00:00:35,994 --> 00:00:37,454  
[Music] This is where  
the suits worn

7  
00:00:37,454 --> 00:00:41,416  
by Apollo astronauts are sewn,  
cemented, assembled, and tested.

8  
00:00:41,958 --> 00:00:43,918  
ILC industries in Dover,

9  
00:00:43,918 --> 00:00:46,421  
Delaware is where they  
put it all together.

10  
00:00:46,421 --> 00:00:54,596  
Arms, legs, torso,  
boots, the end product,

11  
00:00:54,888 --> 00:00:58,600  
an incredibly reliable custom  
tailored hand assembled life

12

00:00:58,600 --> 00:01:00,977

support system, a space suit.

13

00:01:01,436 --> 00:01:03,813

The initial measurements taken

14

00:01:03,813 --> 00:01:05,690

at NASA's manned  
spacecraft center

15

00:01:05,690 --> 00:01:08,860

in Houston are the first step.

16

00:01:10,278 --> 00:01:12,489

>> When an astronaut is assigned

17

00:01:12,489 --> 00:01:16,117

to a particular flight  
many measurements are taken

18

00:01:16,117 --> 00:01:18,078

of his body approximately 60.

19

00:01:18,453 --> 00:01:21,790

It takes three months from the  
time we have his measurements

20

00:01:21,998 --> 00:01:24,250

until we do have a  
spacesuit built for him,

21

00:01:24,501 --> 00:01:29,047

and there's a formula involved  
to give the man maximum mobility

22

00:01:29,631 --> 00:01:32,967

in a confinement of you might  
say a pressurized balloon.

23

00:01:33,968 --> 00:01:37,555

It is in this production  
room that the balloon

24

00:01:37,555 --> 00:01:40,225

like inner suit called  
the bladder is assembled.

25

00:01:40,767 --> 00:01:43,019

Individual parts  
move on a schedule

26

00:01:43,019 --> 00:01:44,854

that brings all the  
pieces together

27

00:01:44,854 --> 00:01:46,564

into an integrated space suit.

28

00:01:47,774 --> 00:01:49,484

Meanwhile, on the second floor

29

00:01:49,484 --> 00:01:52,028

of the plant the white  
outer suit consisting

30

00:01:52,028 --> 00:01:54,781

of 17 layers is cut  
out and assembled.

31

00:01:55,365 --> 00:01:58,910

These include a layer of woven  
Teflon to provide resistance

32

00:01:58,910 --> 00:02:03,081

to abrasions, a layer of fire  
retardant fiberglass called beta

33

00:02:03,081 --> 00:02:06,459  
clock, and a series of  
nylon restraints to hold

34

00:02:06,459 --> 00:02:08,962  
in the inner suit, like  
the skin of a football.

35

00:02:09,379 --> 00:02:12,423  
So close to the tolerances  
that if a part is cut out

36

00:02:12,423 --> 00:02:14,884  
and doesn't match  
the pattern by a 32nd

37

00:02:14,884 --> 00:02:18,221  
of an inch, it must be recut.

38

00:02:18,221 --> 00:02:20,682  
Gloves must fit so  
perfectly that they are made

39

00:02:20,682 --> 00:02:23,434  
from plaster casts of  
the astronauts hands.

40

00:02:23,434 --> 00:02:26,855  
It takes 160 hours  
to make a single pair

41

00:02:26,855 --> 00:02:29,315  
of molds, and gloves.

42

00:02:29,315 --> 00:02:32,068  
During qualification  
testing suits are subjected

43

00:02:32,068 --> 00:02:35,280  
to 10 times the design

requirements of a lunar mission.

44

00:02:35,488 --> 00:02:39,909

Another critical area  
are the pressure tests.

45

00:02:40,368 --> 00:02:44,164

To be accepted a spacesuit must  
have practically zero leakage

46

00:02:44,164 --> 00:02:47,625

when pressurized.

47

00:02:47,625 --> 00:02:48,835

Each of the prime crewmen

48

00:02:48,835 --> 00:02:51,212

on an Apollo mission  
has three suits made,

49

00:02:51,504 --> 00:02:54,632

a training suit used till the  
day of launch, a flight suit,

50

00:02:54,799 --> 00:02:56,384

and one that serves as a backup.

51

00:02:56,801 --> 00:02:59,304

The last stop is  
called the fit check.

52

00:02:59,304 --> 00:03:02,765

Here Astronaut Charles M.  
Duke, Lunar Module Pilot

53

00:03:02,765 --> 00:03:06,853

for the upcoming Apollo 16 moon  
landing next March tries on one

54

00:03:06,853 --> 00:03:08,646  
of his suits for  
size and comfort.

55  
00:03:09,147 --> 00:03:09,689  
>> Okay, sir.

56  
00:03:09,689 --> 00:03:10,440  
You're at advanced pressure.

57  
00:03:10,440 --> 00:03:11,191  
You want to stay there?

58  
00:03:11,357 --> 00:03:13,693  
>> Yeah, let me work  
it out a little bit.

59  
00:03:13,693 --> 00:03:15,570  
>> The fifth check  
is done in two parts.

60  
00:03:15,570 --> 00:03:17,113  
First, the inner suit is worn.

61  
00:03:18,489 --> 00:03:20,200  
Adjustments are made and later

62  
00:03:20,200 --> 00:03:24,037  
in the day the astronaut dawns  
the two pieces now put together

63  
00:03:24,037 --> 00:03:25,788  
as one totally integrated suit.

64  
00:03:25,788 --> 00:03:32,670  
It is here that the suit is  
finally accepted or sent back

65  
00:03:32,670 --> 00:03:33,755

for additional changes.

66

00:03:33,796 --> 00:03:38,218

We asked Astronaut Duke  
to comment on his suits.

67

00:03:38,718 --> 00:03:39,928

>> Yeah, it's a good fit.

68

00:03:40,720 --> 00:03:44,057

Both my suits have  
an excellent fit,

69

00:03:44,057 --> 00:03:45,892

so we haven't had  
any trouble at all.

70

00:03:46,434 --> 00:03:48,561

This is my second time  
or actually a third time.

71

00:03:48,561 --> 00:03:51,606

I have a training suit,  
and then two flight suits.

72

00:03:51,606 --> 00:03:54,025

One spare, and one prime suit.

73

00:03:54,025 --> 00:03:56,611

Both flight suits just  
fit exceptionally well.

74

00:03:57,695 --> 00:03:58,321

Real pleased.

75

00:04:00,531 --> 00:04:03,409

>> [Music] Like a jigsaw puzzle  
the pieces forming a garment

76

00:04:03,409 --> 00:04:05,578

that the astronauts  
can wear with comfort

77

00:04:05,578 --> 00:04:07,705

and confidence are  
brought together.

78

00:04:07,789 --> 00:04:11,209

A garment that serves as a  
small scale earth environment