1
00:00:00,000 --> 00:00:04,885
MUSIC

2
00:00:04,920 --> 00:00:06,078
So we are getting ready to

3
00:00:06,113 --> 00:00:07,710
static fire the QM-1 static

4
00:00:07,745 --> 00:00:09,070
test motor. It's a full rocket

5
00:00:09,105 --> 00:00:10,318
booster, it's made of five

6
00:00:10,353 --> 00:00:11,598
segments pieced together…and

7
00:00:11,633 --> 00:00:13,045
that's important because we've

8
00:00:13,080 --> 00:00:14,430
added another length of a

9
00:00:14,465 --> 00:00:15,560
segment into this booster to

10
00:00:15,595 --> 00:00:16,798
make it bigger and better. A lot

11
00:00:16,833 --> 00:00:18,133
of planning and work is done

12
00:00:18,168 --> 00:00:19,206
ahead of time as we design

13
00:00:19,241 --> 00:00:20,630

these rocket boosters to get

14
00:00:20,665 --> 00:00:22,109
the propellant geometry just

15
00:00:22,144 --> 00:00:23,957
right. We know at any given

16
00:00:23,992 --> 00:00:25,149
time during the burn of that

17
00:00:25,184 --> 00:00:27,613
motor what the thrust is and

18
00:00:27,648 --> 00:00:29,445
what the profile of the

19
00:00:29,480 --> 00:00:30,797
pressure is inside that motor.

20
00:00:30,832 --> 00:00:32,596
So with the new thrust profile

21
00:00:32,631 --> 00:00:34,901
for the SLS boosters we've

22
00:00:34,936 --> 00:00:37,060
added an extra fin and changed

23
00:00:37,095 --> 00:00:38,573
some of the geometry of our

24
00:00:38,608 --> 00:00:39,772
propellant surfaces so we can

25
00:00:39,807 --> 00:00:41,253
burn more propellant at the

26
00:00:41,288 --> 00:00:42,947
beginning of the test, or at

27
00:00:42,982 --> 00:00:44,388
the beginning of the rocket

28
00:00:44,423 --> 00:00:46,316
firing. To get a solid rocket

29
00:00:46,351 --> 00:00:47,868
booster to burn we have an

30
00:00:47,903 --> 00:00:50,140
igniter at the front end that is

31
00:00:50,175 --> 00:00:51,524
like a small rocket itself, and

32
00:00:51,559 --> 00:00:52,875
it shoots a flame hundred and

33
00:00:52,910 --> 00:00:54,413
fifty feet down this entire

34
00:00:54,448 --> 00:00:55,940
rocket booster and it ignites

35
00:00:55,975 --> 00:00:57,152
all the surface of the

36
00:00:57,187 --> 00:00:58,564
propellant all at once. Once

37
00:00:58,599 --> 00:01:00,084
you ignite a solid rocket

38
00:01:00,119 --> 00:01:01,484

booster you can't stop it. You

39
00:01:01,519 --> 00:01:02,579
don't flip a switch to turn it

40
00:01:02,614 --> 00:01:03,675
on and off. At the same time

41
00:01:03,710 --> 00:01:04,923
you turn a knob to increase

42
00:01:04,958 --> 00:01:06,164
your thrust or decrease your

43
00:01:06,199 --> 00:01:07,227
thrust. That's why it's

44
00:01:07,262 --> 00:01:08,387
important to design this

45
00:01:08,422 --> 00:01:09,979
beforehand. So we can get the

46
00:01:10,014 --> 00:01:11,331
amount of thrust we need at each

47
00:01:11,366 --> 00:01:12,682
point during this two minute

48
00:01:12,717 --> 00:01:14,115
burn to reach the maximum thrust

49
00:01:14,150 --> 00:01:16,563
at given time points that we

50
00:01:16,598 --> 00:01:17,955
need. At the beginning of the

51
00:01:17,990 --> 00:01:19,923
burn is when we have the most

52
00:01:19,958 --> 00:01:21,339
thrust, about three and a half

53
00:01:21,374 --> 00:01:22,466
million pounds of thrust that

54
00:01:22,501 --> 00:01:23,522
we maintain for about twenty

55
00:01:23,557 --> 00:01:24,634
five seconds. It takes just

56
00:01:24,669 --> 00:01:26,378
over two minutes of rocket

57
00:01:26,413 --> 00:01:27,459
firing for the propellant to

58
00:01:27,494 --> 00:01:28,938
completely burn out. The

59
00:01:28,973 --> 00:01:30,338
propellant is burning really

60
00:01:30,373 --> 00:01:31,747
fast; it's got a certain rate

61
00:01:31,782 --> 00:01:33,361
that it's burning from inside

62
00:01:33,396 --> 00:01:35,482
out. So as every second goes by

63
00:01:35,517 --> 00:01:37,394

it's like one layer of that

64
00:01:37,429 --> 00:01:39,050
propellant is essentially being

65
00:01:39,085 --> 00:01:40,386
peeled away and shot out the

66
00:01:40,421 --> 00:01:41,618
end of that rocket motor.

67
00:01:41,653 --> 00:01:42,913
Rocket science is not easy.

68
00:01:42,948 --> 00:01:44,729
This is a complex booster;

69
00:01:44,764 --> 00:01:46,034
we spend a lot of time and

70
00:01:46,069 --> 00:01:47,665
effort to get this right. And

71
00:01:47,700 --> 00:01:49,449
this is the first qualification

72
00:01:49,484 --> 00:01:51,946
test of this kind of rocket…I'm

73
00:01:51,981 --> 00:01:53,785
very confident that this booster

74
00:01:53,820 --> 00:01:55,441
static test motor is going to