1
00:00:00,000 --> 00:00:05,925
MUSIC

2
00:00:05,960 --> 00:00:07,909
This project has been a real

3
00:00:07,944 --> 00:00:09,917
fun effort in trying to take a

4
00:00:09,952 --> 00:00:12,406
heritage booster that had many

5
00:00:12,441 --> 00:00:14,012
many years of reliability and

6
00:00:14,047 --> 00:00:15,485
great performance and evolve it

7
00:00:15,520 --> 00:00:17,573
into something bigger and better

8
00:00:17,608 --> 00:00:18,925
When we first under took the

9
00:00:18,960 --> 00:00:20,853
design and qualification for the

10
00:00:20,888 --> 00:00:22,469
new booster, part of the mission

11
00:00:22,504 --> 00:00:24,557
was to make the booster more

12
00:00:24,592 --> 00:00:28,116
affordable and more modernÖand

13
00:00:28,151 --> 00:00:29,244

of course it had to be

14
00:00:29,279 --> 00:00:30,581
completely redesigned for a new

15
00:00:30,616 --> 00:00:31,908
mission. Itís a larger booster

16
00:00:31,943 --> 00:00:33,565
and the mission profile is

17
00:00:33,600 --> 00:00:35,763
sufficiently different to where

18
00:00:35,798 --> 00:00:37,299
pretty much everything on the

19
00:00:37,334 --> 00:00:38,604
inside of the booster is

20
00:00:38,639 --> 00:00:40,212
different. There are well over

21
00:00:40,247 --> 00:00:42,036
a thousand individual processes.

22
00:00:42,071 --> 00:00:43,924
Working with our customer we

23
00:00:43,959 --> 00:00:45,411
were able to identify several

24
00:00:45,446 --> 00:00:47,090
hundred areas of improvement.

25
00:00:47,125 --> 00:00:49,084
Weíve got totally new avionics

26
00:00:49,119 --> 00:00:51,379
on this vehicle versus what we

27
00:00:51,414 --> 00:00:52,516
had on Shuttle. Itís state of

28
00:00:52,551 --> 00:00:54,092
the art. Weíve taken that

29
00:00:54,127 --> 00:00:56,747
avionics and actually tested it

30
00:00:56,782 --> 00:00:58,779
in development units in a full

31
00:00:58,814 --> 00:01:00,355
flight configurationÖ and weíre

32
00:01:00,390 --> 00:01:01,851
about to enter some

33
00:01:01,886 --> 00:01:03,884
qualification testing with that

34
00:01:03,919 --> 00:01:05,603
system. But in this particular

35
00:01:05,638 --> 00:01:07,018
test we will actually control

36
00:01:07,053 --> 00:01:08,211
the thrust vector control

37
00:01:08,246 --> 00:01:09,539
system with the flight avionics.

38
00:01:09,574 --> 00:01:11,538

The old Shuttle program

39
00:01:11,573 --> 00:01:13,355
utilized a rubber insulation

40
00:01:13,390 --> 00:01:15,465
between the case segment and

41
00:01:15,500 --> 00:01:17,386
the propellant that contained

42
00:01:17,421 --> 00:01:20,098
asbestos, and so we selected a

43
00:01:20,133 --> 00:01:22,003
fiber called PPI which is used

44
00:01:22,038 --> 00:01:24,026
widely in the fire protection

45
00:01:24,061 --> 00:01:26,370
industryÖdeveloped a new rubber

46
00:01:26,405 --> 00:01:28,210
formulation and ended up with a

47
00:01:28,245 --> 00:01:29,554
rubber thatís actually higher

48
00:01:29,589 --> 00:01:30,858
performing than the previous

49
00:01:30,893 --> 00:01:32,226
material which allowed us to

50
00:01:32,261 --> 00:01:33,642
remove a fair amount of

51
00:01:33,677 --> 00:01:35,482
insulation and replace it with

52
00:01:35,517 --> 00:01:37,025
fuel and get a little bit more

53
00:01:37,060 --> 00:01:38,409
performance out of it. So not

54
00:01:38,444 --> 00:01:40,266
only is it environmentally

55
00:01:40,301 --> 00:01:41,690
friendly itís a higher

56
00:01:41,725 --> 00:01:42,866
performing material and a

57
00:01:42,901 --> 00:01:44,065
higher performing rocket.

58
00:01:44,100 --> 00:01:45,832
Structurally weíve had to make

59
00:01:45,867 --> 00:01:47,281
some changes. The aft attach

60
00:01:47,316 --> 00:01:48,913
point of this booster, in order

61
00:01:48,948 --> 00:01:50,785
to accommodate the structural

62
00:01:50,820 --> 00:01:52,633
configuration of the SLS vehicle,

63
00:01:52,668 --> 00:01:54,569

has been moved several feet aft.

64
00:01:54,604 --> 00:01:56,616
Actually, this QM-1 test will

65
00:01:56,651 --> 00:01:58,577
be the first test, in a static

66
00:01:58,612 --> 00:02:00,185
configuration, that weíve done

67
00:02:00,220 --> 00:02:01,769
with that actual SLS attach

68
00:02:01,804 --> 00:02:04,001
point in place. We had to

69
00:02:04,036 --> 00:02:05,457
design a new core, and a new

70
00:02:05,492 --> 00:02:06,552
propellant grain inside the

71
00:02:06,587 --> 00:02:07,800
fuel thatís inside the rocket.

72
00:02:07,835 --> 00:02:10,208
Part of the required us to

73
00:02:10,243 --> 00:02:11,288
design and manufacture all new

74
00:02:11,323 --> 00:02:13,224
tooling that forms the inside

75
00:02:13,259 --> 00:02:15,177
of the motor. We had to

76
00:02:15,212 --> 00:02:16,752
redesign our nozzle because we

77
00:02:16,787 --> 00:02:18,216
have a different performance,

78
00:02:18,251 --> 00:02:19,344
different things going on

79
00:02:19,379 --> 00:02:21,176
inside the motorÖand so a large

80
00:02:21,211 --> 00:02:22,648
portion of the nozzle was

81
00:02:22,683 --> 00:02:24,184
redesigned. Also, weíve had a

82
00:02:24,219 --> 00:02:26,271
major, major effort over the

83
00:02:26,306 --> 00:02:27,527
last two years to try to

84
00:02:27,562 --> 00:02:29,103
improve the affordability of

85
00:02:29,138 --> 00:02:30,824
this vehicle, because the

86
00:02:30,859 --> 00:02:32,207
intent was not only to have a

87
00:02:32,242 --> 00:02:34,592
higher performing vehicle but

88
00:02:34,627 --> 00:02:36,198

to have one that actually cost

89
00:02:36,233 --> 00:02:38,407
less. And we believe weíve

90
00:02:38,442 --> 00:02:39,799
achieved that and this test of