1
00:00:00,850 --> 00:00:02,690
George Diller/Launch Commentator: This is Pegasus Launch Control,

2
00:00:02,690 --> 00:00:07,310
T minus one hour, 35 minutes 54 seconds and counting.

3
00:00:07,310 --> 00:00:12,380
Joining us now here in the Mission Directors Center is Al Sierra,

4
00:00:12,380 --> 00:00:17,380
the director of the Flight Projects Office for NASA's Launch Services Program.

5
00:00:17,380 --> 00:00:21,950
And Al is going to talk to us some about what we've done to

6
00:00:21,950 --> 00:00:25,230
get the Pegasus and the NuSTAR ready for the flight.

7
00:00:25,230 --> 00:00:29,810
And, Al, this really goes back quite some time because most of the work was

8
00:00:29,810 --> 00:00:37,190
done out at California at Vandenberg Air Force Base much earlier this year...

9
00:00:37,190 --> 00:00:40,260
I think they got started getting things ready to fly. But,

10
00:00:40,260 --> 00:00:46,280
now we're going to show some video and if you could talk us through what we're seeing.

11
00:00:46,280 --> 00:00:48,370
Al Sierra/Launch Services Program Flight Projects Office Director: Absolutely, George.

12
00:00:48,370 --> 00:00:53,610
OK, so here we're seeing the Pegasus launch vehicle in Building 1555,

13
00:00:53,610 --> 00:00:57,790

which is located at Vandenberg Air Force Base in California.

14
00:00:57,790 --> 00:01:03,360
You see the technicians there getting various parts of the rocket assembled.

15
00:01:03,360 --> 00:01:07,570
This rocket is assembled in the horizontal orientation as

16
00:01:07,570 --> 00:01:11,760
opposed to some rockets that are put together in vertical.

17
00:01:11,760 --> 00:01:19,010
Right now, you see they're installing the aft skirt that is part of the first stage of the vehicle.

18
00:01:19,010 --> 00:01:27,320
And you know, Pegasus is very unique in the sense that it's the only rocket that has wings.

19
00:01:27,320 --> 00:01:33,390
The wings are fixed wings. It's a composite and steel material is what it's made of.

20
00:01:33,390 --> 00:01:40,180
And that aft skirt you see there is part of the closeout of that aft nozzle.

21
00:01:40,180 --> 00:01:45,220
The Pegasus has a total of three stages, first stage, second stage and third stage.

22
00:01:45,220 --> 00:01:50,880
Right there, you see they're putting on the avionics structure on to the third stage.

23
00:01:50,880 --> 00:01:58,280
That avionics structure holds all of the computers and the tank with gaseous nitrogen,

24
00:01:58,280 --> 00:02:01,930
which is used for our reaction controller basically steering

25
00:02:01,930 --> 00:02:05,680
that third stage engine and inserting the spacecraft in the proper orbit.

26
00:02:05,680 --> 00:02:12,480
There you see a picture of the first stage and those items there are the fins.

27
00:02:12,480 --> 00:02:17,220
Those fins are installed on the aft end of the first stage.

28
00:02:17,220 --> 00:02:22,910
As you see there's a crane operation where they will hoist and install those fins.

29
00:02:22,910 --> 00:02:26,320
The fins are used to steer that first stage.

30
00:02:26,320 --> 00:02:32,540
Unlike other rockets, this nozzle on the first stage is fixed so it does not move.

31
00:02:32,540 --> 00:02:37,060
So, it uses these fins to steer the rocket.

32
00:02:37,060 --> 00:02:46,040
Kind of like an airplane would steer with its elevons and its vertical stabilizer,

33
00:02:46,040 --> 00:02:53,930
the Pegasus will steer with those fins. And those fins are operated with electromechanical actuators.

34
00:02:53,930 --> 00:02:59,920
Interesting fact on the Pegasus is that the first stage,

35
00:02:59,920 --> 00:03:05,160
I guess the total weight of the rocket is about 51,000 pounds.

36
00:03:05,160 --> 00:03:12,280
And that first stage, once it's ignited, will burn approximately 71 seconds.

37
00:03:12,280 --> 00:03:19,700
Second stage will burn about 73 seconds. And then that third stage will burn a total of about 68 seconds.

38
00:03:19,700 --> 00:03:24,430

As you see here this is a transporter that they use to transport the

39
00:03:24,430 --> 00:03:32,440
Pegasus rocket out to the what we call the hot pad, or where the L-1011 is waiting for it.

40
00:03:32,440 --> 00:03:38,670
It's a tight operation there. The wingspan of the Pegasus is about 22 feet,

41
00:03:38,670 --> 00:03:43,250
wingspan from left to right and that opening of the door is basically just,

42
00:03:43,250 --> 00:03:47,300
they basically have about a foot on each side of clearance.

43
00:03:47,300 --> 00:03:52,400
Here you see the NuSTAR spacecraft. It's being processed in a white room,

44
00:03:52,400 --> 00:03:57,320
I guess in a clean room. Basically a tented area where we maintain the

45
00:03:57,320 --> 00:04:00,620
cleanliness levels to protect the instruments.

46
00:04:00,620 --> 00:04:06,300
They're installing the payload fairing on the, that basically protects the spacecraft

47
00:04:06,300 --> 00:04:10,900
during launch and during the captive-carry on the L-1011.

48
00:04:10,900 --> 00:04:16,050
This fairing is made of composite material that's basically two halves that are

49
00:04:16,050 --> 00:04:22,280
pulled together and then bolted and attached to the launch vehicle.

50
00:04:22,280 --> 00:04:33,130
It uses basically a separation system that's initiated with some linear-shape charge explosives.

51
00:04:33,130 --> 00:04:39,710
The transport operation starts very early in the morning, at about 5 a.m.,

52
00:04:39,710 --> 00:04:45,750
they start all of the preparations to pull the rocket out of the Building 1555

53
00:04:45,750 --> 00:04:49,100
as you see there they're pulling the rocket out.

54
00:04:49,100 --> 00:04:54,010
They maintain a purge in the payload fairing while during the transport

55
00:04:54,010 --> 00:04:59,450
operation to make sure that the spacecraft is kept in a clean and dry environment.

56
00:04:59,450 --> 00:05:04,750
That morning when the spacecraft, when the rocket was pulled out to the hot pad,

57
00:05:04,750 --> 00:05:09,310
you can see that it was a very foggy day, but it still met the criteria for

58
00:05:09,310 --> 00:05:13,290
that operation so they proceeded with all the mating operations.

59
00:05:13,290 --> 00:05:23,100
As you see there, they will be lifting the Pegasus rocket onto the L-1011, or Orbital OCA,

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00:05:23,100 --> 00:05:26,570
Orbital Carrier Aircraft, they call it the Stargazer.

61
00:05:26,570 --> 00:05:34,960
It uses a system of hooks and umbilicals to connect the rocket to the aircraft.

62
00:05:34,960 --> 00:05:43,260
Those umbilicals, we have electrical umbilicals, we have umbilicals to maintain air conditioning,

63
00:05:43,260 --> 00:05:48,580

inside the payload fairing to maintain the cleanliness of the spacecraft and keep it cool.

64
00:05:48,580 --> 00:05:54,970
And the electrical umbilicals provide information on the vehicle health.

65
00:05:54,970 --> 00:05:59,540
And there you see the aircraft, the aircraft taking off.

66
00:05:59,540 --> 00:06:05,780
This L-1011 is now, was there en route to Kwajalein.

67
00:06:05,780 --> 00:06:11,470
They had one night stopover over at Hawaii Air Force Base at Hickam.

68
00:06:11,470 --> 00:06:14,910
George Diller/Launch Commentator: Well, Albert, we take a fair number of people to

69
00:06:14,910 --> 00:06:20,510
Kwajalein along with the L-1011 in order to do the countdown.

70
00:06:20,510 --> 00:06:25,850
Tell us some about how many people went out and who all went out with it.

71
00:06:25,850 --> 00:06:28,210
Al Sierra/Launch Services Program Flight Projects Office Director: OK. So, we have roughly about 55

72
00:06:28,210 --> 00:06:31,530
folks out there at Kwaj supporting this launch.

73
00:06:31,530 --> 00:06:36,770
It's a combination of Orbital, Orbital folks.

74
00:06:36,770 --> 00:06:42,890
Orbital Sciences operates the aircraft and the launch vehicle.

75
00:06:42,890 --> 00:06:48,100
We have folks supporting the NuSTAR project, which is basically the spacecraft

76
00:06:48,100 --> 00:06:56,020
folks and then we have some Launch Services Program NASA engineers and launch directors out there as we

77
00:06:56,020 --> 00:06:59,540
George Diller/Launch Commentator: Well, Albert, thank you very much for walking through

78
00:06:59,540 --> 00:07:05,170
with us what we've taken to get to this point today to get the Pegasus ready for flight.

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00:07:05,170 --> 00:07:05,790
Thank you very much.

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00:07:05,790 --> 00:07:06,510
Al Sierra/Launch Services Program Flight Projects Office Director: You're welcome. Sure thing.