1
00:00:03,879 --> 00:00:06,970
This morning we have sort of a unique event
going on.

2
00:00:06,970 --> 00:00:11,290
We are going to have a reboost where we are
going to fire the engines on the aft end of

3
00:00:11,290 --> 00:00:17,699
the space station to increase our velocity
in orbit around the Earth about 1 meter per

4
00:00:17,699 --> 00:00:19,080
second or so.

5
00:00:19,080 --> 00:00:26,080
So, not a lot, but enough to raise our orbit
a little bit and to prepare for a coming Progress

6
00:00:28,060 --> 00:00:33,160
supply ship as well as the space shuttle shortly
after that.

7
00:00:33,160 --> 00:00:40,160
Now, some of you have asked why we need to
do a re-boost, do we stay in orbit? And questions

8
00:00:40,830 --> 00:00:45,800
like that.
The answer is there is a small amount of drag

9
00:00:45,800 --> 00:00:50,210
here even two hundred miles above the Earth.

10
00:00:50,210 --> 00:00:52,690
They say it's from atomic oxygen.

11
00:00:52,690 --> 00:00:57,960
So, there is a very small amount of oxygen

present out there in the vacuum of space,

12
00:00:57,960 --> 00:01:01,050
so it’s not 100 percent of vacuum.

13
00:01:01,050 --> 00:01:07,400
And those atoms cause a finite amount of drag
on the space station, so over a period of

14
00:01:07,400 --> 00:01:13,670
time we slow down and our altitude over the
Earth decreases.

15
00:01:13,670 --> 00:01:20,170
So, due to that and also due to the requirements
of rendezvous and spacecraft like progress

16
00:01:20,170 --> 00:01:22,689
and shuttle, we need to adjust the orbit;

17
00:01:22,689 --> 00:01:27,039
usually increase it periodically, and we are
going to do that this morning.

18
00:01:27,039 --> 00:01:30,859
I am going to give a demonstration while it
is happening so that you can see the acceleration

19
00:01:30,859 --> 00:01:37,499
from the engine so let’s head down to the
Russian segment and prepare for that.

20
00:01:37,499 --> 00:01:40,539
Here we are down in the Russian segment and
the service module.

21
00:01:40,539 --> 00:01:46,479
And we don’t actually operate the re-boost
here on board. The ground programs it and

22
00:01:46,479 --> 00:01:49,090
then the computers onboard execute the re-boost.

23
00:01:49,090 --> 00:01:54,569
But we can have insight into the parameters
coming up, and it looks like we programmed

24
00:01:54,569 --> 00:02:00,139
to do a 2.7 meter per second increase in our
Delta V. W

25
00:02:00,139 --> 00:02:07,139
hen the engines fire we will experience a
small acceleration not a whole lot, but it

26
00:02:08,149 --> 00:02:13,090
will be a 0.0185 meters per second squared,

27
00:02:13,090 --> 00:02:18,250
and I am going to try and demonstrate that
at the time of ignition and during the burn.

28
00:02:18,250 --> 00:02:23,490
Now the way I going to demonstrate the acceleration
that comes during the reboost is by using

29
00:02:23,490 --> 00:02:24,580
this camera.

30
00:02:24,580 --> 00:02:28,940
800 mm lens, so it’s pretty massive actually,

31
00:02:28,940 --> 00:02:33,610
and you can see I can float it here and there
is no reboost going on right now so the camera

32
00:02:33,610 --> 00:02:37,860
is not going to go anywhere.

33
00:02:38,710 --> 00:02:40,777
It’s just going to slowly drift due to the ventilation,

34
00:02:40,880 --> 00:02:45,140
or if I put any velocity into it, it will drift out of the scene.

35
00:02:46,140 --> 00:02:48,140
But I am going to hold it here steady then you can see that it stays very steady.

36
00:02:48,480 --> 00:02:52,900
That is going to be different at the point of ignition entering the reboost.

37
00:02:52,900 --> 00:02:56,330
You will see that here in a few minutes.

38
00:02:56,330 --> 00:02:59,980
Okay we have about 40 seconds or so before the burn starts again.

39
00:02:59,980 --> 00:03:05,180
We're in weightlessness right now and there is no accelerations, virtually no acceleration

40
00:03:05,180 --> 00:03:05,950
on us.

41
00:03:05,950 --> 00:03:11,700
You can see I am floating this camera right here, and it’s not going anywhere.

42
00:03:11,700 --> 00:03:15,910
That is going to change here in just a little while.

43
00:03:15,910 --> 00:03:22,910

Let’s see. Looks like we have about 20 seconds to go until our scheduled burn time.

44
00:03:23,080 --> 00:03:26,710
There’s my camera. I'm setting it up for ignition.

45
00:03:26,710 --> 00:03:31,540
Here it goes. It actually came a little bit early.

46
00:03:31,540 --> 00:03:35,070
Now watch the camera accelerate toward you.

47
00:03:35,070 --> 00:03:35,570
Here it goes.

48
00:03:35,570 --> 00:03:40,810
I am going to reach out and grab it and bring it back in the view here.

49
00:03:40,810 --> 00:03:43,170
And I'm holding it. I'm actually feeling the acceleration.

50
00:03:43,170 --> 00:03:46,080
I am going to let go again.

51
00:03:46,080 --> 00:03:47,330
Here it goes.

52
00:03:47,330 --> 00:03:49,830
It is going to take off.

53
00:03:49,830 --> 00:03:55,830
I'll try not to let it hit you.

54
00:03:55,880 --> 00:04:00,880
Just going to miss you.

55
00:04:01,720 --> 00:04:03,840
The burn is still going on.
0:04:04.840,0:04:04.090
I'm going to let go again.

56
00:04:05,910 --> 00:04:10,160
Here it goes.

57
00:04:13,950 --> 00:04:14,370
The burn is continuing.

58
00:04:18,370 --> 00:04:19,040
Again I will demonstrate it one more time.

59
00:04:20,040 --> 00:04:21,380
Here's my heavy camera.

60
00:04:22,380 --> 00:04:23,700
I'm going to let go.

61
00:04:23,800 --> 00:04:29,560
It is going to begin to accelerate towards
you.

62
00:04:30,560 --> 00:04:38,560
Now what would happen if I let go of myself?

63
00:04:39,910 --> 00:04:43,770
I am going to let go now, and here I go drifting
toward you again,

64
00:04:43,770 --> 00:04:50,330
so the acceleration applies to me too.

65
00:04:50,330 --> 00:04:54,430
Ah, there I can hear the engine cut off.

66

00:04:54,430 --> 00:04:56,810
So the burn is complete.

67
00:04:56,810 --> 00:05:03,810
We have reached our 2.7 meters per second
that we desired,

68
00:05:03,990 --> 00:05:10,990
and now if I let go of the camera it’s not
going anywhere, so the burn is over.