TVIS

Treadmill with Vibration Isolation and Stabilization

1
00:00:01,266 --> 00:00:04,986
Good morning and welcome to today's
International Space Station update hour.

2
00:00:06,026 --> 00:00:09,266
Getting a look now inside the International
Space Station flight control room

3
00:00:09,496 --> 00:00:13,486
as ground controllers monitor the
systems on board the floating complex.

4
00:00:15,166 --> 00:00:21,336
Today's team is currently being led by Flight
Director Jerry Jason, and joining him at CAPCOM,

5
00:00:21,336 --> 00:00:23,596
it's veteran astronaut Shannon Lucid.

6
00:00:26,066 --> 00:00:30,866
Space station currently orbiting
off the southeastern tip of Africa

7
00:00:31,126 --> 00:00:36,896
at an altitude of about 260 statute miles.

8
00:00:37,076 --> 00:00:43,786
It's moving into an orbital sunset, and
then on board is the Expedition 30 crew.

9
00:00:46,596 --> 00:00:47,926
Here you can see them now.

10
00:00:47,926 --> 00:00:52,116
In the center is NASA astronaut and
Expedition 30 Commander Dan Burbank,

11
00:00:52,816 --> 00:00:57,866
and to the left is Russian

cosmonaut Anton Shkaplerov.

12
00:00:58,456 --> 00:01:03,336
And on the right joining them is another
Russian cosmonaut, Anatoly Ivanishin.

13
00:01:04,886 --> 00:01:10,636
The three docked to the space station back on
November 15 in their Soyuz TMA-22 spacecraft

14
00:01:11,056 --> 00:01:18,266
and then started their Expedition 30
increment last week after the departure

15
00:01:18,456 --> 00:01:21,646
of Expedition 29 Commander Mike Fossum.

16
00:01:25,656 --> 00:01:32,696
The remaining three members of Expedition 30
will launch on December 21 to join Burbank,

17
00:01:32,696 --> 00:01:35,776
Shkaplerov and Ivanishin and round
out the crew of Expedition 30.

18
00:01:38,376 --> 00:01:43,766
Here you can see them with
European astronaut Andre Kuipers,

19
00:01:45,196 --> 00:01:49,226
Russian cosmonaut Oleg Kononenko
and NASA astronaut Don Pettit.

20
00:01:49,436 --> 00:01:54,426
Again they will launch December 21 bringing
the station back to its six-man crew rotation.

21
00:01:55,776 --> 00:02:03,736
Fairly busy day today on orbit as the
crew awakened about midnight Central time,

22
00:02:03,806 --> 00:02:07,606
began their day with routine medical
checks, taking body mass measurements

23
00:02:07,606 --> 00:02:14,576
and other muscle measurements and then conducted
a daily planning conference with control centers

24
00:02:14,576 --> 00:02:17,546
around the world as they went
over the day's activities.

25
00:02:20,686 --> 00:02:25,386
NASA astronaut Dan Burbank started his
day off with some camera positioning

26
00:02:25,676 --> 00:02:31,546
as the crew is videotaping a lot
of their exercise activities today.

27
00:02:33,276 --> 00:02:38,646
He set up that camera to videotape the ARED,

28
00:02:38,906 --> 00:02:46,916
which stands for the Advanced Resistive Exercise
Device, just one of the many exercise pieces

29
00:02:46,916 --> 00:02:49,436
of equipment that they have
on board the station.

30
00:02:50,026 --> 00:02:51,046
You can see that now.

31
00:02:52,436 --> 00:02:59,876
It functions as a squat bar as the astronauts
can do muscle training to maintain bone mass

32

00:02:59,876 --> 00:03:03,116
and muscle strength while in
that microgravity environment.

33
00:03:05,306 --> 00:03:09,796
He's also doing some extensive work
today on the Combustion Integrated Rack

34
00:03:09,796 --> 00:03:15,436
and the Fluids Integrated Rack, which together
make up the Fluids and Combustion Facility,

35
00:03:15,856 --> 00:03:18,776
and he's getting that ready for
some upcoming experiment work.

36
00:03:21,386 --> 00:03:26,326
That Combustion Integrated Rack has an optics
bench, a combustion chamber and then fuel

37
00:03:26,326 --> 00:03:32,526
and oxidizer controls for performing a variety
of combustion experiments in microgravity.

38
00:03:34,476 --> 00:03:39,176
He'll be installing some alignment guides as
they prepare that for further utilization.

39
00:03:40,756 --> 00:03:46,176
Following that, he'll be completing
a periodic medical exam before moving

40
00:03:46,176 --> 00:03:50,706
on to replace an air filter in
the Waste and Hygiene Compartment,

41
00:03:51,026 --> 00:04:00,806
which is one of the crew Waste
Management System components.

42

00:04:00,806 --> 00:04:00,873
[foreign]

43
00:04:00,873 --> 00:04:05,956
And following that, he'll move on to
a Treadmill Kinematics experiment,

44
00:04:09,626 --> 00:04:15,326
and this is a rigorous experiment which
helps to quantify the biomechanics

45
00:04:15,326 --> 00:04:19,526
of treadmill exercise conditions
as these astronauts are

46
00:04:19,526 --> 00:04:21,676
on board for long-duration space flights.

47
00:04:22,546 --> 00:04:25,386
Here you can see the TVIS,
which stands for the Treadmill

48
00:04:25,386 --> 00:04:27,566
with Vibration Isolation and Stabilization.

49
00:04:28,036 --> 00:04:36,196
That is a treadmill that the astronauts run on
and is insulated so the microgravity experiments

50
00:04:36,376 --> 00:04:42,506
on board the station aren't affected
detrimentally from any vibration that is caused

51
00:04:42,506 --> 00:04:44,486
by the astronauts running on those treadmills.

52
00:04:45,606 --> 00:04:48,096
The objective of that experiment today will be

53

00:04:48,096 --> 00:04:52,646
to determine the most beneficial exercise
conditions that can be used to maintain

54
00:04:52,646 --> 00:04:55,916
or improve crew member health during
their long-duration space flight.

55
00:04:59,276 --> 00:05:04,306
Later on in the day, Commander
Burbank will be doing some inspections

56
00:05:04,306 --> 00:05:08,046
of Portable Breathing Apparatuses
as well as some work

57
00:05:08,046 --> 00:05:15,326
in the Minus Eighty-degree Laboratory Freezer,
or MELFI, which is used to sustain a wide range

58
00:05:15,326 --> 00:05:22,566
of life science experiments by preserving
biological samples that are collected

59
00:05:22,566 --> 00:05:25,656
on board the station for later
return and analysis back on Earth.

60
00:05:25,736 --> 00:05:31,066
They store these samples at very low
temperatures to maintain their integrity.

61
00:05:35,196 --> 00:05:40,596
He'll finish off his day with some final
work on that Combustion Integrated Rack,

62
00:05:41,866 --> 00:05:47,856
relocating some gas delivery bottles and
then doing some software upgrades on one

63

00:05:47,856 --> 00:05:50,216
of the communication units on board the station.

64
00:05:52,416 --> 00:05:57,316
His crewmate Anton Shkaplerov
started his day off by rigging

65
00:05:57,316 --> 00:06:02,936
up his Human Research Facility Holter
monitor, which is a battery-powered,

66
00:06:02,936 --> 00:06:08,966
non-invasive electro-cardiogram device that
is used to accurately measure the heart rate

67
00:06:08,966 --> 00:06:11,316
of crew members over an extended period of time.

68
00:06:12,216 --> 00:06:17,776
He'll wear this for about 24 hours as part
of an experiment to monitor his heart rate.

69
00:06:18,636 --> 00:06:24,536
Following this, he completed a periodic health
exam and then got some exercise on that TVIS,

70
00:06:24,536 --> 00:06:26,516
that treadmill that we just
showed you previously.

71
00:06:28,126 --> 00:06:33,516
Then moving on through his day, he began
the transfer of items from Progress 45,

72
00:06:34,456 --> 00:06:38,696
which launched back on October 30 and
docked with the station on November 2.

73
00:06:38,696 --> 00:06:45,216
Progress is that cargo supply vehicle

launched on the Russian rockets.

74
00:06:47,736 --> 00:06:54,726
Here you can see it docked, and above it
is the Soyuz TMA-22, which brought the crew

75
00:06:55,266 --> 00:06:57,506
to the International Space
Station back in November.

76
00:07:01,956 --> 00:07:06,366
His day will be rounded out by changing
a dust collector filter cartridge

77
00:07:06,566 --> 00:07:10,846
on the Zvezda service module, which
is one of the Russian segment pieces.

78
00:07:11,316 --> 00:07:17,856
And then he will be copying some data from
a micro-accelerometer experiment to a laptop

79
00:07:18,046 --> 00:07:22,586
and then getting in one last bit
of exercise on that ARED device.

80
00:07:26,566 --> 00:07:31,856
Then the third member of the Expedition 30
crew Anatoly Ivanishin is also doing some dust

81
00:07:31,856 --> 00:07:37,326
collector filter work but on the Zarya
module and also getting some exercise in on

82
00:07:37,326 --> 00:07:41,676
that ARED device and doing a
monthly inspection of the TVIS.

83
00:07:41,966 --> 00:07:45,696
He did that earlier this

morning, checking device cables,

84
00:07:45,696 --> 00:07:48,696
harnesses and the control panel and gyroscopes.

85
00:07:48,946 --> 00:07:55,616
The rest of his day is taken up with some
cargo transfer from their Soyuz spacecraft

86
00:07:56,116 --> 00:07:57,506
and then doing some replacement work

87
00:07:57,506 --> 00:08:01,776
with the air purification system
in the Zvezda service module.

88
00:08:04,166 --> 00:08:08,326
He'll then do one last update to the
station's Inventory Management System,

89
00:08:08,826 --> 00:08:11,846
get some exercise on the TVIS
and that'll round out his day.

90
00:08:13,186 --> 00:08:17,446
The crew will have one more daily
planning conference with ground stations

91
00:08:17,446 --> 00:08:21,776
around the planet before moving into
their pre-sleep period where they will go

92
00:08:21,776 --> 00:08:26,066
over the day's items and do any wrap-up
work that's necessary before moving