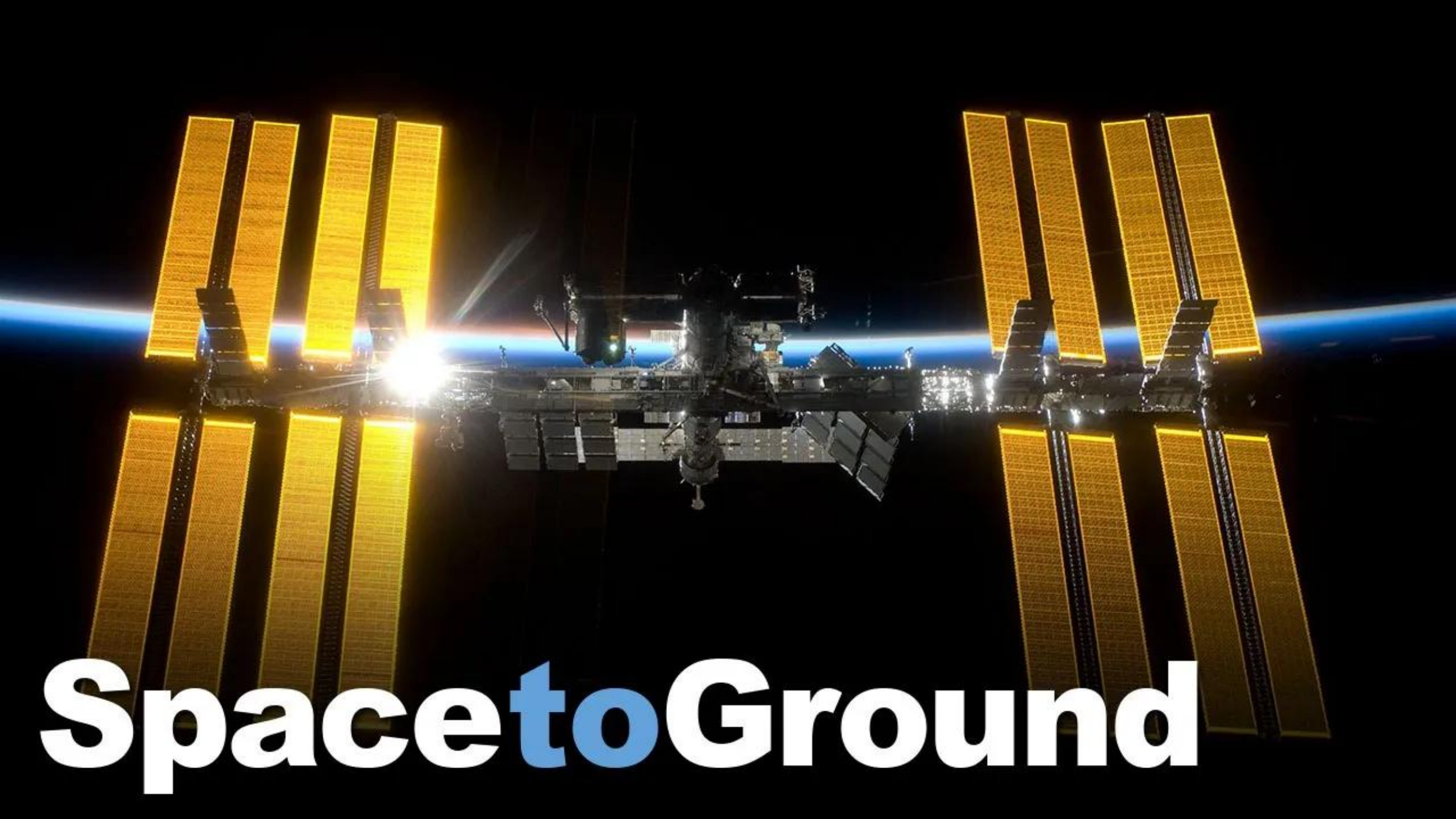
SpacetoGround

1
00:00:03,110 --> 00:00:05,130
"HOUSTON, STATION ON SPACE TO GROUND."

2
00:00:05,130 --> 00:00:08,109
WELCOME TO SPACE TO GROUND, I AM KAYLA LAFRANCE.

3
00:00:08,109 --> 00:00:10,490
THIS WEEK THE ORBITING LABORATORY WELCOMES

4
00:00:10,490 --> 00:00:13,290
A NEW VISITOR WITH LOTS OF NEW SUPPLIES.

5
00:00:13,290 --> 00:00:15,650
"LIFTOFF OF ANTARES!"

6
00:00:15,650 --> 00:00:18,540
ON SATURDAY, THE NORTHROP GRUMMAN

7
00:00:18,540 --> 00:00:22,040
CRS-14 CYGNUS SPACECRAFT SUCCESSFULLY LAUNCHED

8
00:00:22,040 --> 00:00:25,520
FROM NASA'S WALLOPS FLIGHT FACILITY IN VIRGINIA.

9
00:00:25,520 --> 00:00:29,090
CARRYING NEARLY 8000 LBS OF HARDWARE AND SUPPLIES,

10
00:00:29,090 --> 00:00:32,550
THIS MISSION MARKS THE 14TH FLIGHT OF CYGNUS

11
00:00:32,550 --> 00:00:34,370
AS A COMMERCIAL CARGO PROVIDER

12
00:00:34,370 --> 00:00:36,870
TO THE INTERNATIONAL SPACE STATION.

13
00:00:36,870 --> 00:00:39,360

AFTER A JOURNEY OF 56 HOURS,

14
00:00:39,360 --> 00:00:41,500
CYGNUS REACHED THE ORBITING LABORATORY

15
00:00:41,500 --> 00:00:45,690
AND NASA ASTRONAUT CHRIS CASSIDY USED THE
STATION'S

16
00:00:45,690 --> 00:00:48,080
CANADARM 2 TO REACH OUT AND GRAB THE VEHICLE,

17
00:00:48,080 --> 00:00:51,030
ALLOWING GROUND TEAMS TO MANEUVER AND BERTH

18
00:00:51,030 --> 00:00:53,670
THE SPACECRAFT AT UNITY'S NADIR PORT.

19
00:00:53,670 --> 00:00:57,760
THE CARGO CRAFT, NAMED THE S.S. KALPANA CHAWLA

20
00:00:57,760 --> 00:01:00,649
IN HONOR OF THE FIRST WOMAN OF INDIAN DESCENT

21
00:01:00,649 --> 00:01:01,149
TO GO TO SPACE, WILL STAY ATTACHED TO THE
SPACE STATION

22
00:01:01,149 --> 00:01:06,168
UNTIL MID-DECEMBER.

23
00:01:06,168 --> 00:01:08,000
MEANWHILE AT BAIKONUR,

24
00:01:08,000 --> 00:01:10,000
FINAL PREPARATIONS ARE UNDER WAY

25
00:01:10,000 --> 00:01:13,180

FOR THE NEXT FLIGHT TO THE SPACE STATION.

26
00:01:13,180 --> 00:01:14,970
NASA ASTRONAUNT KATE RUBINS

27
00:01:14,970 --> 00:01:17,170
AND HER RUSSIAN CREWMATES ARE CONCLUDING

28
00:01:17,170 --> 00:01:19,930
THEIR PRELAUNCH ACTIVITIES, BEFORE LAUNCHING

29
00:01:19,930 --> 00:01:24,520
FROM THE COSMODROME FOR A SIX-MONTH MISSION
ABOARD THE ORBITING LAB.

30
00:01:24,520 --> 00:01:26,781
THIS FLIGHT, SCHEDULED FOR LIFTOFF ON WEDNESDAY,

31
00:01:26,781 --> 00:01:28,777
WILL BE QUICK.

32
00:01:28,777 --> 00:01:30,740
THE TIME FROM LAUNCH TO DOCKING

33
00:01:30,740 --> 00:01:34,080
WILL BE JUST OVER THREE HOURS, ABOUT THE SAME
TIME

34
00:01:34,080 --> 00:01:36,580
IT TAKE FOR A COMMERICAL AIRLINER TO FLY

35
00:01:36,580 --> 00:01:39,549
FROM SEATTLE TO MINNEAPOLIS.

36
00:01:39,549 --> 00:01:41,710
BE SURE TO TUNE IN TO NASA-TV

37
00:01:41,710 --> 00:01:44,340

AND THE AGENCY'S WEB SITE ON OCTOBER 14TH,

38
00:01:44,340 --> 00:01:46,689
AND FOLLOW THE FLIGHT.

39
00:01:46,689 --> 00:01:48,500
ALSO, WE INVITE YOU TO CHECK OUT

40
00:01:48,500 --> 00:01:51,990
THE LATEST EDITION OF "HOUSTON, WE HAVE
A PODCAST".

41
00:01:51,990 --> 00:01:54,170
BEFORE HER UPCOMING MISSION,

42
00:01:54,170 --> 00:01:56,670
ASTRONAUT AND MICROBIOLOGIST KATE RUBINS

43
00:01:56,670 --> 00:01:59,810
SAT DOWN WITH OUR GARY JORDAN TO TALK ABOUT

44
00:01:59,810 --> 00:02:01,380
A WIDE ARRAY OF SUBJECTS,

45
00:02:01,380 --> 00:02:06,500
INCLUDING BEING THE FIRST PERSON TO SEQUENCE
DNA IN SPACE.

46
00:02:06,500 --> 00:02:08,920
THIS WEEK'S QUESTION COMES FROM GUY ETHRIDGE,

47
00:02:08,920 --> 00:02:12,190
WHO WANTED TO KNOW IF A POWERFUL SPEAKER

48
00:02:12,190 --> 00:02:15,850
INSIDE THE ISS, MOUNTED TO AN INNER WALL,

49
00:02:15,850 --> 00:02:17,560

CRANKED TO 11,

50
00:02:17,560 --> 00:02:22,090
COULD CREATE A MEASURABLE THRUST AGAINST THE
ISS?

51
00:02:22,090 --> 00:02:24,590
THIS IS A VERY INTERESTING QUESTION.

52
00:02:24,590 --> 00:02:26,810
IN SHORT, THE ANSWER IS NO,

53
00:02:26,810 --> 00:02:28,930
A SPEAKER PRODUCING SOUND WAVES

54
00:02:28,930 --> 00:02:31,300
COULD NOT BE USED TO CREATE THRUST

55
00:02:31,300 --> 00:02:35,113
AGAINST THE ISS, OR TO MOVE THE ISS.

56
00:02:35,113 --> 00:02:37,340
WE MOVE IN SPACE BY CREATING PRESSURE

57
00:02:37,340 --> 00:02:38,983
THROUGH EJECTING MASS.

58
00:02:38,983 --> 00:02:40,450
NEWTON'S 3RD LAW TELLS US

59
00:02:40,450 --> 00:02:43,970
THAT EVERY ACTION HAS AN EQUAL AND OPPOSITE
REACTION.

60
00:02:43,970 --> 00:02:47,620
THUS WE CAN CREATE THRUST OR MOVEMENT

61
00:02:47,620 --> 00:02:49,240

IN THE OPPOSITE DIRECTION WHEN

62
00:02:49,240 --> 00:02:51,670
WE EJECT MASS OUT OF AN ENGINE.

63
00:02:51,670 --> 00:02:54,682
WE CAN SEE THIS IN THE ROCKET THRUST EQUATION.

64
00:02:54,682 --> 00:02:56,520
A SOUND WAVE CAN BE REFERRED TO

65
00:02:56,520 --> 00:02:59,180
AS A PRESSURE WAVE BECAUSE IT CONSISTS OF

66
00:02:59,180 --> 00:03:01,450
A REPEATING PATTERN OF HIGH-PRESSURE

67
00:03:01,450 --> 00:03:03,340
AND LOW-PRESSURE REGIONS MOVING

68
00:03:03,340 --> 00:03:04,959
THROUGH A MEDIUM.

69
00:03:04,959 --> 00:03:07,099
HOWEVER, IN ORDER FOR SOUND TO MOVE,

70
00:03:07,099 --> 00:03:08,959
IT HAS TO HAVE A MEDIUM

71
00:03:08,959 --> 00:03:10,790
IN WHICH TO PASS THROUGH.

72
00:03:10,790 --> 00:03:12,030
SINCE SPACE IS A VACUUM,

73
00:03:12,030 --> 00:03:14,540
IT WILL NOT BE ABLE TO PROPAGATE OUT

74
00:03:14,540 --> 00:03:16,730
OF THE STATION TO CREATE MOVEMENT.

75
00:03:16,730 --> 00:03:18,459
THE SOUND FROM THE SPEAKERS

76
00:03:18,459 --> 00:03:21,930
WOULD PRODUCE VIBRATIONS THROUGHOUT THE HULL

77
00:03:21,930 --> 00:03:25,430
OF THE ISS THAT OUR SENSITIVE SENSORS WOULD
LIKELY DETECTED,

78
00:03:25,430 --> 00:03:28,750
BUT SINCE MASS IS NOT BEING EJECTED FROM THE
ISS

79
00:03:28,750 --> 00:03:30,520
DUE TO THE PRESSURE OF THE SOUND WAVES,

80
00:03:30,520 --> 00:03:32,909
IT WOULD NOT BE ABLE TO CREATE MOVEMENT,

81
00:03:32,909 --> 00:03:35,819
OR MEASURABLE THRUST.

82
00:03:35,819 --> 00:03:37,620
KEEP SENDING YOUR QUESTIONS USING