1
00:00:03,490 --> 00:00:08,950
THE MAIN FOCUS FOR THE CREW ON BOARD THE INTERNATIONAL
SPACE STATION THIS FALL IS ON THE STATION'S

2
00:00:08,950 --> 00:00:15,219
TOP PRIORITY: GROUND-BREAKING SCIENTIFIC RESEARCH
THAT CAN'T BE DONE ANYWHERE ELSE…SCIENCE

3
00:00:15,219 --> 00:00:20,869
THAT HELPS THE PEOPLE OF EARTH TODAY AND ADVANCES
THE TECHNOLOGY NEEDED TO SUPPORT SPACE EXPLORATION

4
00:00:20,869 --> 00:00:23,350
BEYOND EARTH TOMORROW.

5
00:00:23,350 --> 00:00:27,680
THIS CREW BRINGS A RANGE OF EXPERIENCE TO
THE TASK, STARTING WITH A COMMANDER WHO IS

6
00:00:27,680 --> 00:00:33,180
FINISHING UP HIS THIRD LONG-DURATION SPACEFLIGHT
WITH SPECIAL ATTENTION TO EXPERIMENTS THAT

7
00:00:33,180 --> 00:00:36,770
COULD CHANGE LIVES ON THE GROUND.

8
00:00:36,770 --> 00:00:42,970
We working with experiments for AIDS, for
hepatitis and for… …for cancer, and if

9
00:00:42,970 --> 00:00:51,670
we help humans for one of these directions,
I hope we've done with everything, with

10
00:00:51,670 --> 00:00:57,140
each dollar, with each ruble on space station
program.

11
00:00:57,140 --> 00:01:03,680

TWO OF THE FLIGHT ENGINEERS, NOW MORE THAN
100 DAYS INTO THEIR FIRST LONG MISSION, ARE

12
00:01:03,680 --> 00:01:09,189
WORKING TO FIND OUT HOW THE ENVIRONMENT OF
LOW EARTH ORBIT IMPACTS HUMAN BODIES.

13
00:01:09,189 --> 00:01:12,140
Probably one of the most important things,
at least from the crew member's perspective,

14
00:01:12,140 --> 00:01:16,649
is crew health, and so we need to look at
all of the things that radiation and lack

15
00:01:16,649 --> 00:01:22,799
of gravity do to us and, make sure that we
can mitigate that, all the negative effects,

16
00:01:22,799 --> 00:01:24,619
as much as possible.

17
00:01:24,619 --> 00:01:28,899
SOME OF THAT RESEARCH INTO WAYS TO PROTECT
PEOPLE FROM THE EFFECTS OF SPACEFLIGHT IS

18
00:01:28,899 --> 00:01:34,530
PAYING OFF FOR PEOPLE ON EARTH: FOR INSTANCE,
THE USE OF A PORTABLE ULTRASOUND MACHINE TO

19
00:01:34,530 --> 00:01:40,049
MAP CHANGES TO THE SPINE OVER THE COURSE OF
A FLIGHT HAS APPLICATIONS FOR USING A SIMILAR

20
00:01:40,049 --> 00:01:43,070
MACHINE IN OTHER "REMOTE" LOCATIONS…

21
00:01:43,070 --> 00:01:50,289
…Developing protocols and softwares to improve
the imaging on these machines could mean that,

22
00:01:50,289 --> 00:01:55,780
soon after we are, we complete our experiments,
the technology that we import on the ground

23
00:01:55,780 --> 00:02:00,319
could help people over, all over the world
to have access to, to better diagnosis on

24
00:02:00,319 --> 00:02:01,390
their spine.

25
00:02:01,390 --> 00:02:07,509
A ONCE AND FUTURE SPACE STATION COMMANDER,
WHO IS ALSO A MEDICAL DOCTOR, HAS TWO LONG-DURATION

26
00:02:07,509 --> 00:02:12,700
FLIGHTS TO HIS CREDIT ALREADY, AND SO HE HAS
SOME INSIGHT INTO AREAS THAT NEED SPECIAL

27
00:02:12,700 --> 00:02:18,370
ATTENTION, SUCH AS THE IMPACT TO THE VISION
OF SOME CREW MEMBERS…

28
00:02:18,370 --> 00:02:27,440
The intracranial pressure changes, very serious
problems that we need to address, intraocular

29
00:02:27,440 --> 00:02:29,980
pressure changes.

30
00:02:29,980 --> 00:02:39,681
So we need to develop some procedures, measures,
how we can protect crewmates from that, so

31
00:02:39,681 --> 00:02:44,720
this helps not only crewmates but people on
Earth as well.

32

00:02:44,720 --> 00:02:50,170
THIS CREW INCLUDES A BIOCHEMIST WHOSE RESEARCH
HAS FOCUSED ON HOW SPACE TRAVELERS LOSE BONE

33
00:02:50,170 --> 00:02:55,100
AND MUSCLE MASS, AND SUFFER IMPACTS TO THE
RESPIRATORY AND OTHER SYSTEMS OF THE BODY

34
00:02:55,100 --> 00:02:56,790
OVER TIME.

35
00:02:56,790 --> 00:03:05,290
We will start a new experiment to improve
the countermeasures system; it's more of

36
00:03:05,290 --> 00:03:07,920
a physical exercise experiment.

37
00:03:07,920 --> 00:03:13,690
And we also pay a lot of attention to the
vestibular experiments as well…

38
00:03:13,690 --> 00:03:19,010
…AND, THE CREW INCLUDES AN AEROSPACE ENGINEER
WHO BRINGS FRESH EYES TO THE SCIENCE OF THE

39
00:03:19,010 --> 00:03:22,340
STATION ON HIS FIRST TRIP TO ORBIT.

40
00:03:22,340 --> 00:03:27,800
We have this bone loss, we have the, the muscle
mass loss; we get, we get taller.

41
00:03:27,800 --> 00:03:33,170
So all of those effects, people, we want to
try and understand, really what's happening

42
00:03:33,170 --> 00:03:36,810
and how can we mitigate some of those effects
if they're negative, and so, yeah, just,

43
00:03:36,810 --> 00:03:40,610
just being there, we, we are an experiment
in work.

44
00:03:40,610 --> 00:03:46,510
IN THE AREAS OF HUMAN LIFE SCIENCES, AS WELL
AS PHYSICS AND PHYSICAL SCIENCES AND TECHNOLOGY

45
00:03:46,510 --> 00:03:51,950
DEVELOPMENT PLUS EARTH OBSERVATION AND EDUCATION,
THE STATION'S PARTNER NATIONS ARE PUSHING

46
00:03:51,950 --> 00:03:56,830
THE LIMITS OF SCIENCE AS THEY GET SMARTER
ABOUT WHAT WILL BE NEEDED TO SUPPORT FUTURE

47
00:03:56,830 --> 00:04:01,780
EXPLORERS ON MISSIONS AWAY FROM EARTH THAT
WILL LAST FOR YEARS.

48
00:04:01,780 --> 00:04:06,320
ON THIS FLIGHT THE CREW WILL EXPERIENCE SOMETHING
THAT HASN'T HAPPENED IN YEARS: THEY'LL

49
00:04:06,320 --> 00:04:10,000
BE PART OF A NINE-PERSON CREW ON ORBIT.

50
00:04:10,000 --> 00:04:14,230
THAT HAPPENS IN EARLY NOVEMBER, WHEN ANOTHER
SOYUZ SPACECRAFT ARRIVES.

51
00:04:14,230 --> 00:04:20,090
SOYUZ COMMANDER MIKHAIL TYURIN, NASA'S RICK
MASTRACCHIO AND JAPAN'S KOICHI WAKATA START

52
00:04:20,090 --> 00:04:25,469
THEIR TOUR OF DUTY BY DELIVERING AN OLYMPIC
TORCH, PART OF THE TORCH RELAY TO THE SITE

53
00:04:25,469 --> 00:04:32,050
OF THE WINTER OLYMPIC GAMES IN SOCHI, RUSSIA,
IN FEBRUARY OF 2014.

54
00:04:32,050 --> 00:04:37,419
During this short period of time of direct
handover that will last for four days, Oleg

55
00:04:37,419 --> 00:04:44,370
Kotov and I will perform an EVA, one of the
tasks of which is to take the Olympic torch

56
00:04:44,370 --> 00:04:45,630
to space,

57
00:04:45,630 --> 00:04:52,740
We will take a picture with it with the space
station in the background, with the Earth

58
00:04:52,740 --> 00:05:01,610
in the background, and we will try to make
sure that we see Russia and maybe Sochi where

59
00:05:01,610 --> 00:05:04,360
the Olympic Games will take place…

60
00:05:04,360 --> 00:05:10,009
THEY'LL ALSO RETRIEVE A SPACE EXPOSURE EXPERIMENT
AND PERFORM MAINTENANCE ON OTHER PAYLOADS

61
00:05:10,009 --> 00:05:14,699
ON THE EXTERIOR OF THE RUSSIAN SEGMENT OF
THE STATION BEFORE BRINGING THE TORCH BACK

62
00:05:14,699 --> 00:05:15,830
INSIDE.

63
00:05:15,830 --> 00:05:20,360
TWO DAYS LATER, YURCHIKHIN, PARMITANO AND

NYBERG DEPART THE STATION WITH THE OLYMPIC

64
00:05:20,360 --> 00:05:26,129
TORCH IN HAND…THEIR DEPARTURE MARKS THE
START OF EXPEDITION 38 AND KOTOV'S SECOND

65
00:05:26,129 --> 00:05:28,650
TOUR OF DUTY AS STATION COMMANDER.

66
00:05:28,650 --> 00:05:33,439
HE AND RYAZANSKIY PLAN TO DO AT LEAST ONE
MORE SPACEWALK, IN DECEMBER, TO INSTALL TWO

67
00:05:33,439 --> 00:05:39,500
CAMERAS OUTSIDE THE ZVEZDA MODULE FOR AN OPTICAL
TELESCOPE SYSTEM, EXCHANGE SOME EXPERIMENT

68
00:05:39,500 --> 00:05:45,740
HARDWARE, AND REMOVE AND JETTISON TWO COMMUNICATIONS
ANTENNAE FROM THE POISK MODULE.

69
00:05:45,740 --> 00:05:51,270
AFTER THAT, EXPEDITION 38 FIGURES TO BE THE
CENTER OF A BUSY SPACE TRAFFIC PATTERN: THE

70
00:05:51,270 --> 00:05:56,830
FIRST OPERATIONAL FLIGHT OF THE AMERICAN COMMERCIAL
CARGO SHIP CYGNUS IS TARGETED TO ARRIVE AT

71
00:05:56,830 --> 00:06:02,550
THE STATION IN MID-DECEMBER, AND STAY FOR
A MONTH; SHORTLY AFTER IT DEPARTS, THE NEXT

72
00:06:02,550 --> 00:06:07,820
DRAGON CARGO CRAFT IS DUE TO TAKE THE DOCKING
PORT ON THE HARMONY MODULE FOR A MONTH, AND

73
00:06:07,820 --> 00:06:13,600
WHILE THE CREW WORKS ON ITS SHIPMENT OF SUPPLIES
THEY'LL ALSO RECEIVE ANOTHER RUSSIAN PROGRESS

74
00:06:13,600 --> 00:06:15,099
FREIGHTER.

75
00:06:15,099 --> 00:06:19,600
KOTOV AND HIS SOYUZ CREWMATES LEAVE THE STATION
IN MID-MARCH TO COME HOME TO EARTH, AFTER

76
00:06:19,600 --> 00:06:25,370
NEARLY SIX FULL MONTHS IN SPACE PURSUING THE
ADVANCEMENT OF SCIENTIFIC KNOWLEDGE…LEARNING

77
00:06:25,370 --> 00:06:31,080
HOW TO TAKE CARE OF HUMAN EXPLORERS IN SPACE,
AND LEARNING SO MUCH MORE THAN THAT…

78
00:06:31,080 --> 00:06:35,819
…We're learning about the world in which
we live, we're learning about the machines

79
00:06:35,819 --> 00:06:41,340
that it takes to get us there and how those
systems operate and how often they need to

80
00:06:41,340 --> 00:06:46,309
be repaired and what works and what hasn't
worked and, and so all of those are such a