1
00:00:01,200 --> 00:00:03,069
>> This is Mission
Control Houston.

2
00:00:03,069 --> 00:00:05,871
The year 2013 is has kicked off

3
00:00:05,871 --> 00:00:08,774
on board the International
Space Station with a range

4
00:00:08,774 --> 00:00:12,678
of science operations showing
just a portion of the kinds

5
00:00:12,678 --> 00:00:15,147
of groundbreaking research
that are being conducted

6
00:00:15,147 --> 00:00:18,317
in lower Earth orbit
to prepare human beings

7
00:00:18,317 --> 00:00:20,519
to explore deep space.

8
00:00:20,519 --> 00:00:21,987
Early this week, Monday,

9
00:00:21,987 --> 00:00:25,224
Commander Kevin Ford started
his day with blood draws,

10
00:00:25,224 --> 00:00:26,792
which are a standard procedure

11
00:00:26,792 --> 00:00:29,929
to acquire samples
for later study.

12
00:00:29,929 --> 00:00:32,865
They'll be used in several
investigations looking

13
00:00:32,865 --> 00:00:36,168
at how life in a micro
gravity environment affects the

14
00:00:36,168 --> 00:00:37,636
biological processes.

15
00:00:37,636 --> 00:00:42,675
Ford also worked as the crew
medical officer in conjunction

16
00:00:42,675 --> 00:00:44,810
with a periodic fitness
evaluation

17
00:00:44,810 --> 00:00:47,313
for flight engineer
Chris Hadfield.

18
00:00:47,313 --> 00:00:50,082
Ford did his own
daily exercises,

19
00:00:50,082 --> 00:00:54,386
which are a standard
daily requirement --

20
00:00:54,386 --> 00:00:57,189
twice daily requirement
for all crew members --

21
00:00:57,189 --> 00:01:00,159
that is designed to maintain
their physical fitness

22
00:01:00,159 --> 00:01:02,862
and prevent bone
and muscle atrophy.

23
00:01:02,862 --> 00:01:04,930
He also spent the
afternoon of his day working

24
00:01:04,930 --> 00:01:07,666
on the Capillary
Flow Experiment.

25
00:01:07,666 --> 00:01:10,769
That's one of the
physics research projects;

26
00:01:10,769 --> 00:01:14,540
this one looking into
how fluids behave

27
00:01:14,540 --> 00:01:16,609
in the absence of gravity.

28
00:01:16,609 --> 00:01:20,813
Flight engineers Evgeny Tarelkin
and Roman Romanenko worked

29
00:01:20,813 --> 00:01:22,615
on the Sainar [phonetic]
Experiment

30
00:01:22,615 --> 00:01:24,383
in the Russian module.

31
00:01:24,383 --> 00:01:27,052
That's a Russian
investigation that's designed

32
00:01:27,052 --> 00:01:30,089

to help commercial fishermen
find the most productive

33
00:01:30,089 --> 00:01:31,757
fishing grounds.

34
00:01:31,757 --> 00:01:34,793
Also on Monday, flight
engineer Tom Marshburn powered

35
00:01:34,793 --> 00:01:39,198
up the ultrasound in order
to do some self-scans

36
00:01:39,198 --> 00:01:42,234
for the Integrated
Cardiovascular Experiment,

37
00:01:42,234 --> 00:01:46,205
which is quantifying the
atrophy of cardiac muscle,

38
00:01:46,205 --> 00:01:49,575
trying to identify the
causes of that in order

39
00:01:49,575 --> 00:01:51,410
to develop better
countermeasures

40
00:01:51,410 --> 00:01:55,181
that will be needed for crew
members on long duration flights

41
00:01:55,181 --> 00:01:58,417
that go well beyond earth orbit.

42
00:01:58,417 --> 00:02:02,154
All six of the Expedition 34
crew members had a day off duty

43
00:02:02,154 --> 00:02:06,992
on Tuesday to celebrate the
first day of the brand new year,

44
00:02:06,992 --> 00:02:09,428
but they got right back
to work on Wednesday.

45
00:02:09,428 --> 00:02:11,797
For Commander Kevin
Ford, he went to work

46
00:02:11,797 --> 00:02:15,100
in the Destiny Laboratory
setting up the robonaut,

47
00:02:15,100 --> 00:02:19,572
Robonaut 2, and the
associated hardware for two days

48
00:02:19,572 --> 00:02:22,474
of continued evaluations
that are designed

49
00:02:22,474 --> 00:02:26,378
to help develop new robotic
capabilities for space

50
00:02:26,378 --> 00:02:28,747
for manipulating mechanisms.

51
00:02:28,747 --> 00:02:30,983
The hope -- the goal here is

52
00:02:30,983 --> 00:02:35,421
that the Robonaut 2 will help
lead to eventual assistance,

53

00:02:35,421 --> 00:02:39,792
robotic assistance with tasks
and ultimate interaction

54
00:02:39,792 --> 00:02:41,360
with the human crew members.

55
00:02:41,360 --> 00:02:43,562
Flight engineers Oleg Novitskiy

56
00:02:43,562 --> 00:02:47,833
and Evgeny Tarelkin started a
two-day operation replacing a

57
00:02:47,833 --> 00:02:52,204
series of panels in the walls
inside the Zvezda Module,

58
00:02:52,204 --> 00:02:54,873
that's standard maintenance
procedure,

59
00:02:54,873 --> 00:02:56,875
and they spent their
Tuesday afternoon

60
00:02:56,875 --> 00:03:01,213
with the BAR Experiment; that is
testing principles and methods

61
00:03:01,213 --> 00:03:06,118
of leak control for future space
-- space craft construction.

62
00:03:06,118 --> 00:03:09,922
Roman Romanenko had a lot of
maintenance work on Tuesday,

63
00:03:09,922 --> 00:03:13,959
but also time set aside

for crew orientation along

64
00:03:13,959 --> 00:03:18,430
with his Soyuz crewmates Christ
Hadfield and Tom Marshburn.

65
00:03:18,430 --> 00:03:20,332
Hadfield and Marshburn
each worked

66
00:03:20,332 --> 00:03:23,168
with a cognitive
assessment investigation;

67
00:03:23,168 --> 00:03:24,937
that's gathering
data on how living

68
00:03:24,937 --> 00:03:29,375
in space impacts a person's
perception of the environment.

69
00:03:29,375 --> 00:03:33,579
They also spent time that
day on different projects

70
00:03:33,579 --> 00:03:36,081
that are designed to help
people on Earth connect

71
00:03:36,081 --> 00:03:38,150
with what's going on in space.

72
00:03:38,150 --> 00:03:42,855
For Hadfield it was recording
a series of podcasts about life

73
00:03:42,855 --> 00:03:46,659
in space; for Marshburn, he
conducted a couple of interviews

74
00:03:46,659 --> 00:03:51,630
with two television stations
in his native North Carolina.

75
00:03:51,630 --> 00:03:55,267
On Thursday Hadfield and
Marshburn worked together again

76
00:03:55,267 --> 00:03:58,537
to set up the MARES
Experiment hardware.

77
00:03:58,537 --> 00:04:01,974
That acronym stands for
Muscle Atrophy Research

78
00:04:01,974 --> 00:04:06,145
and Exercise System; that's a
European Space Agency project

79
00:04:06,145 --> 00:04:09,515
in human research and counter
measures developmental that's

80
00:04:09,515 --> 00:04:13,218
just getting its first tryout
on the station right now.

81
00:04:13,218 --> 00:04:16,522
Exercise on that MARES
facility is intended

82
00:04:16,522 --> 00:04:19,425
to provide researchers
with a better understanding

83
00:04:19,425 --> 00:04:23,862
of how living in Zero-G affects
the muscular system and also

84
00:04:23,862 --> 00:04:27,433
to evaluate the efficacy
of countermeasures that are

85
00:04:27,433 --> 00:04:35,140
in place now to work against the
deleterious effects of Zero-G.

86
00:04:35,140 --> 00:04:36,542
Marshburn also spent part

87
00:04:36,542 --> 00:04:40,379
of that day helping Commander
Kevin Ford replacing some piping

88
00:04:40,379 --> 00:04:43,415
in the waste hygiene
compartment, that's the toilet

89
00:04:43,415 --> 00:04:46,885
on the U.S. side of the station,
which is just one of a number

90
00:04:46,885 --> 00:04:49,521
of routine maintenance
tasks that crew members have

91
00:04:49,521 --> 00:04:52,791
to take care of on a
daily and weekly basis

92
00:04:52,791 --> 00:04:56,562
to maintain the station's
ability to support them as well

93
00:04:56,562 --> 00:04:59,665
as the science research
that they're doing.

94
00:04:59,665 --> 00:05:01,200
Hadfield retrieved detectors

95
00:05:01,200 --> 00:05:05,037
for an investigation
called the Radi-N Bubble

96
00:05:05,037 --> 00:05:06,538
Detector Experiment.

97
00:05:06,538 --> 00:05:08,974
It's a Canadian experiment
that's designed

98
00:05:08,974 --> 00:05:13,679
to characterize neutron
radiation in the environment.

99
00:05:13,679 --> 00:05:15,047
Hadfield also spent time

100
00:05:15,047 --> 00:05:19,218
on Thursday partially removing
the station's agricultural

101
00:05:19,218 --> 00:05:23,355
camera from the window
observational research facility

102
00:05:23,355 --> 00:05:25,591
in the Destiny laboratory.

103
00:05:25,591 --> 00:05:27,326
The agriculture camera known

104
00:05:27,326 --> 00:05:32,197
as ISSAC has completed
its planned operations.

105
00:05:32,197 --> 00:05:36,368
The expectation is that they'll
have the crew members inspect

106
00:05:36,368 --> 00:05:40,139
that optical quality
window next week,

107
00:05:40,139 --> 00:05:44,143
and then they'll install a
new environmental research

108
00:05:44,143 --> 00:05:48,447
and visualization system in
its place inside the wharf.

109
00:05:48,447 --> 00:05:52,551
The new hardware, the ISERV,
is an automated system

110
00:05:52,551 --> 00:05:56,054
to acquire imagery, it's
designed to gain a lot

111
00:05:56,054 --> 00:05:59,057
of experience in
automated data acquisition,

112
00:05:59,057 --> 00:06:02,795
but in the meantime, it
will acquire useful imagery

113
00:06:02,795 --> 00:06:07,099
for disaster monitoring and
environmental decision-making.

114
00:06:07,099 --> 00:06:08,901
Commander Kevin Ford
started his Friday

115
00:06:08,901 --> 00:06:10,936
with some refresher
training for his role

116
00:06:10,936 --> 00:06:14,306
as a crew medical officer
and devoted most of the rest

117
00:06:14,306 --> 00:06:18,710
of his day, along with help from
flight engineer Tom Marshburn,

118
00:06:18,710 --> 00:06:20,479
to the set up and execution

119
00:06:20,479 --> 00:06:24,082
of the SPHERES Zero
Robotics Experiment.

120
00:06:24,082 --> 00:06:28,420
SPHERES is an experiment using
some experimental free-flying

121
00:06:28,420 --> 00:06:32,524
satellites that can be flown
using programmed commands.

122
00:06:32,524 --> 00:06:35,594
There are teams of students
from all around the world

123
00:06:35,594 --> 00:06:37,463
who have written algorithms

124
00:06:37,463 --> 00:06:41,133
to have the satellites perform
specific tasks that are relevant

125
00:06:41,133 --> 00:06:42,835

to future space missions.

126
00:06:42,835 --> 00:06:44,670
The best of those
entries get a chance

127
00:06:44,670 --> 00:06:48,207
to have their program executed
by the SPHERE's satellites

128
00:06:48,207 --> 00:06:51,477
in a competition onboard the
space station that takes place

129
00:06:51,477 --> 00:06:53,612
on Friday of next week.

130
00:06:53,612 --> 00:06:56,949
Friday of this week Marshburn
spent had early part of his day

131
00:06:56,949 --> 00:06:59,518
on the Integrated
Cardiovascular Experiment

132
00:06:59,518 --> 00:07:02,421
for which he wears some
specialized hardware

133
00:07:02,421 --> 00:07:06,592
to monitor him while he
performs other regular work.

134
00:07:06,592 --> 00:07:09,962
The Integrated cardiovascular
experiment is performed several

135
00:07:09,962 --> 00:07:13,599
times over the course of the
six-month mission in order

136
00:07:13,599 --> 00:07:16,969
to quantify the extent,
the time course,

137
00:07:16,969 --> 00:07:20,606
and the clinical significance
of the decrease in the size

138
00:07:20,606 --> 00:07:24,142
of the heart muscle which
is known to occur in persons

139
00:07:24,142 --> 00:07:27,079
who spend a long time in Zero-G.

140
00:07:27,079 --> 00:07:29,748
Roman Romanenko monitored
another round

141
00:07:29,748 --> 00:07:33,018
of the Russian Plasma Crystal
Experiment which is looking

142
00:07:33,018 --> 00:07:36,421
into the behavior of plasma
dust crystals and fluids

143
00:07:36,421 --> 00:07:39,191
in microgravity, and
saw to some maintenance

144
00:07:39,191 --> 00:07:41,627
of the Soyuz vehicle
he commands,

145
00:07:41,627 --> 00:07:44,897
while flight engineer Evgeny
Tarelkin completed a survey

146
00:07:44,897 --> 00:07:48,200
of the windows in the Russian
segment of the space station,

147
00:07:48,200 --> 00:07:51,470
and Oleg Novitskiy continued
transfers of materials

148
00:07:51,470 --> 00:07:53,138
for disposal into the one

149
00:07:53,138 --> 00:07:56,642
of the progress cargo ships
before joining Tarelkin

150
00:07:56,642 --> 00:07:59,478
for an afternoon working
with the BAR Experiment.

151
00:07:59,478 --> 00:08:02,381
In the coming weekend
in the celebration

152
00:08:02,381 --> 00:08:06,084
of the Russian Orthodox
Christmas on Monday, January 7,

153
00:08:06,084 --> 00:08:09,588
has the Expedition crew looking
forward to a long weekend.

154
00:08:09,588 --> 00:08:11,857
After taking care of
some weekly housecleaning

155
00:08:11,857 --> 00:08:14,459
and regular daily
exercise sessions,

156

00:08:14,459 --> 00:08:17,896
the crew members will have time
off duty as well as conferences

157
00:08:17,896 --> 00:08:20,899
with their families over
the course of the three days

158
00:08:20,899 --> 00:08:23,402
with an eye toward getting
into the research agenda