
35

1
00:00:07,919 --> 00:00:11,460
Why did you want to be a cosmonaut?

2
00:00:11,460 --> 00:00:21,320
Well, as I probably mentioned before, I didn’t
initially plan to be a cosmonaut, because

3
00:00:21,320 --> 00:00:31,750
I grew up in Star City surrounded by cosmonauts,
surrounded by those first cosmonauts that

4
00:00:31,750 --> 00:00:34,469
began flying to space.

5
00:00:34,469 --> 00:00:38,000
I lived with them together because my father
is a cosmonaut.

6
00:00:38,000 --> 00:00:48,670
He flew three times, so I was forced to be
surrounded by cosmonauts.

7
00:00:48,670 --> 00:00:56,829
Whenever we went on a trip, picnic, or business
trip, I was always with my dad and I would

8
00:00:56,829 --> 00:01:01,089
just always be in contact with cosmonauts
and I thought it would be always normal to

9
00:01:01,089 --> 00:01:02,089
be with them.

10
00:01:02,089 --> 00:01:06,670
There was nothing special about it for me.

11
00:01:06,670 --> 00:01:10,780
But I did want to be a pilot.

12
00:01:10,780 --> 00:01:15,039
I wanted to be a military pilot because I
liked airplanes.

13
00:01:15,039 --> 00:01:17,729
I was interested in modeling airplanes.

14
00:01:17,729 --> 00:01:25,210
As a child I made a bunch of little airplane
models and I really enjoyed that, because

15
00:01:25,210 --> 00:01:31,640
I was in good health back then, not now as
a cosmonaut, but when I was younger, I was

16
00:01:31,640 --> 00:01:35,509
in good health, I was strong.

17
00:01:35,509 --> 00:01:46,960
All of this allowed me to be able to join
the flight academy and I went to be a pilot,

18
00:01:46,960 --> 00:01:52,770
a military pilot there.

19
00:01:52,770 --> 00:01:58,460
Finally I was able to become a pilot and an
officer.

20
00:01:58,460 --> 00:02:04,770
All of this happened in the ’90s, the beginning
of the ’90s—the Soviet Union collapsed.

21
00:02:04,770 --> 00:02:13,260
It began to separate into various republics,
and I was studying in Ukraine.

22
00:02:13,260 --> 00:02:22,099
I finished my studies there, so when I graduated

they couldn’t find a place for me in Ukraine.

23
00:02:22,099 --> 00:02:27,760
They said, “Either you stay here in Ukraine
and become a Ukrainian pilot, or you go back

24
00:02:27,760 --> 00:02:31,030
to your home, go back to Russia.”

25
00:02:31,030 --> 00:02:36,739
So I chose to go back to Russia where I had
to learn to fly other types of planes.

26
00:02:36,739 --> 00:02:41,489
Again, the beginning of the ’90s in Russia
was a critical time.

27
00:02:41,489 --> 00:02:47,310
There was an economic crisis and young pilots
were not allowed to fly.

28
00:02:47,310 --> 00:02:49,930
They were not given a chance to do it.

29
00:02:49,930 --> 00:02:58,690
Only older, more experienced pilots were given
that chance.

30
00:02:58,690 --> 00:03:08,120
And so finally I became the pilot of the airplane
that was taking cosmonauts to Baikonur and

31
00:03:08,120 --> 00:03:14,760
back after they landed, so again I was back
in that same environment, again I began meeting

32
00:03:14,760 --> 00:03:20,769
with cosmonauts, and the picture was clear,
they weren’t allowing me to fly a lot, and

33
00:03:20,769 --> 00:03:26,750
so I started thinking about changing jobs,
maybe finding something related to that.

34
00:03:26,750 --> 00:03:37,610
And right at the moment I was told that they're
looking for applicants to join the cosmonauts,

35
00:03:37,610 --> 00:03:38,610
and I thought, why not?

36
00:03:38,610 --> 00:03:40,269
I'll give it a try as well.

37
00:03:40,269 --> 00:03:54,030
After I went through a whole series of medical
tests and psychological tests, I was admitted

38
00:03:54,030 --> 00:03:57,569
into the office of cosmonauts and have been
there since 1998.

39
00:03:57,569 --> 00:04:02,090
That's how I became a cosmonaut.

40
00:04:02,090 --> 00:04:06,480
You said that you grew up in Star City because
your father was a cosmonaut.

41
00:04:06,480 --> 00:04:09,840
What was it like for you to grow up there?

42
00:04:09,840 --> 00:04:14,670
Was it just what you expected, or was it just
the normal life?

43
00:04:14,670 --> 00:04:16,590
Well, yes, of course.

44
00:04:16,590 --> 00:04:18,370
I was born there.

45
00:04:18,370 --> 00:04:23,440
All the neighbors are cosmonauts.

46
00:04:23,440 --> 00:04:34,690
It was the norm, and that's exactly why
I didn't really dream about being a cosmonaut.

47
00:04:34,690 --> 00:04:41,040
I don't think how it would be so wonderful
to be a cosmonaut, because other people who

48
00:04:41,040 --> 00:04:47,730
lived on the other side of Star City, they
were more interesting for me, something new

49
00:04:47,730 --> 00:04:50,440
and unexplored.

50
00:04:50,440 --> 00:04:53,360
So there was nothing special about being a
cosmonaut.

51
00:04:53,360 --> 00:05:00,110
So now, as a cosmonaut, I think this is normal.

52
00:05:00,110 --> 00:05:05,630
For some people, when their parent has a particular
profession, they want to follow and do the

53
00:05:05,630 --> 00:05:06,730
same thing.

54
00:05:06,730 --> 00:05:10,570
Other people want to go a different path because
they don't want to follow.

55
00:05:10,570 --> 00:05:11,590
Is that what you did?

56
00:05:11,590 --> 00:05:16,320
Did you want to have something of your own
that was different from what your father did?

57
00:05:16,320 --> 00:05:20,250
Well, it was fifty-fifty.

58
00:05:20,250 --> 00:05:25,650
I did dream of being a pilot so that was doing
something that my father did.

59
00:05:25,650 --> 00:05:32,840
He also finished the flight academy, also
trained in Ukraine, and that was the same

60
00:05:32,840 --> 00:05:38,770
academy that I went to because I wanted to
be a pilot also, I wanted to continue that

61
00:05:38,770 --> 00:05:52,600
work that he did because
military cosmonauts who enter the profession

62
00:05:52,600 --> 00:06:03,090
from the military, when we fly to space we
also maintain our pilot skills, and so in

63
00:06:03,090 --> 00:06:07,410
that respect I wanted to follow my father
and be a pilot but I didn’t expect that

64
00:06:07,410 --> 00:06:09,800
I would go further.

65
00:06:09,800 --> 00:06:14,830
And you mentioned some of your education and

your professional history.

66
00:06:14,830 --> 00:06:16,370
Tell me about that.

67
00:06:16,370 --> 00:06:22,120
You graduated from high school in Star City,
and then what were the steps along that path

68
00:06:22,120 --> 00:06:26,930
that ultimately led you to be a cosmonaut
yourself?

69
00:06:26,930 --> 00:06:36,910
OK, so I graduated from high school in Star
City.

70
00:06:36,910 --> 00:06:41,190
After that I was already thinking that I want
to follow my dad, in his footsteps.

71
00:06:41,190 --> 00:06:43,380
I needed to join the military.

72
00:06:43,380 --> 00:06:49,080
I wanted to get my act together, become more
disciplined, but since my dad was always away

73
00:06:49,080 --> 00:06:53,260
either in space or on business trips.

74
00:06:53,260 --> 00:06:59,000
My family didn’t have time for me so I decided
to join the Suvorov military academy which

75
00:06:59,000 --> 00:07:01,430
is in St. Petersburg.

76
00:07:01,430 --> 00:07:14,970

I spent two years there and studied general
military science.

77
00:07:14,970 --> 00:07:24,580
At that point, once I graduated, I joined
the Chernigov higher education pilot academy.

78
00:07:24,580 --> 00:07:35,280
After that I became a pilot and in ’98 I
finally found my calling, I became a cosmonaut,

79
00:07:35,280 --> 00:07:41,470
which is where I am now and preparing for
the next flight.

80
00:07:41,470 --> 00:07:47,140
To take the job as a cosmonaut and to fly
in space is to assume some risks that most

81
00:07:47,140 --> 00:07:53,190
people don’t have in their lives, so people
would wonder what is your motivation.

82
00:07:53,190 --> 00:07:58,700
Roman, what is it that you think that we are
learning, what is it that we gain, as a result

83
00:07:58,700 --> 00:08:06,320
of flying people in space that makes it worth
the risk that you take?

84
00:08:06,320 --> 00:08:16,830
Well, I think the people that want to fly
in space, who want to work in space, who want

85
00:08:16,830 --> 00:08:25,500
to go to station, these people realize that
there is a risk inherent to what they do.

86
00:08:25,500 --> 00:08:34,700

They understand that there are possible off-nominal
situations, dangerous situations in space,

87
00:08:34,700 --> 00:08:37,010
and there's no insurance against that.

88
00:08:37,010 --> 00:08:43,399
But, again, the reliability of the technology
that we are surrounded with brings the risk

89
00:08:43,399 --> 00:08:50,689
down with every day because the technology
becomes more and more reliable and we become

90
00:08:50,689 --> 00:08:57,529
better and better trained for various difficult
situations, off-nominal situations on station.

91
00:08:57,529 --> 00:09:07,490
The equipment is constantly updated, modified,
and all of the training that we undergo here

92
00:09:07,490 --> 00:09:17,670
in Houston, all of that training is aimed
at having us as a crew prepare for all the

93
00:09:17,670 --> 00:09:22,930
possible off-nominal situations so that we
can feel comfortable in space, because there

94
00:09:22,930 --> 00:09:29,060
can be occasions when the ground will not
be able to help us get out of a difficult

95
00:09:29,060 --> 00:09:35,200
situation, so the main problems like depressurization
and fire scenarios, we have to know those

96
00:09:35,200 --> 00:09:37,000
by heart.

97
00:09:37,000 --> 00:09:44,000
In other situations, where we don’t need
to react as quickly, the Mission Control Centers

98
00:09:44,000 --> 00:09:50,399
in Moscow and in Houston will be able to help
us, give us directions and guidance.

99
00:09:50,399 --> 00:09:53,670
As for risk, well, that is present everywhere.

100
00:09:53,670 --> 00:10:03,000
A driver can fall asleep behind the wheel;
a pilot can have an accident as well; even

101
00:10:03,000 --> 00:10:09,720
pedestrians walking down the street can miss
a sign and get into trouble.

102
00:10:09,720 --> 00:10:19,420
So, yes, on the one hand we do encounter maximum
risk, but we train for that and we’re ready

103
00:10:19,420 --> 00:10:23,550
to encounter all those situations.

104
00:10:23,550 --> 00:10:30,570
You’re about to launch to the International
Space Station for Expeditions 34 and 35.

105
00:10:30,570 --> 00:10:35,149
Roman, what are the goals of your mission
and what jobs are you going to be doing on

106
00:10:35,149 --> 00:10:36,990
this flight?

107
00:10:36,990 --> 00:10:47,249

Well, the goal of our flight, of our crew,
with Chris Hadfield and Tom Marshburn, is

108
00:10:47,249 --> 00:10:54,100
to follow a science program, to replace the
previous crew, to replenish the station, and

109
00:10:54,100 --> 00:10:57,920
to do all of this successfully.

110
00:10:57,920 --> 00:10:59,720
This is the general idea.

111
00:10:59,720 --> 00:11:07,390
In terms of the Russian tasks and our cosmonauts,
we have some science experiments and some

112
00:11:07,390 --> 00:11:10,139
science programs.

113
00:11:10,139 --> 00:11:14,240
There are some programs and science experiments
that are repeated constantly throughout the

114
00:11:14,240 --> 00:11:19,839
different increments, and specific experiments
which will be done for the first time, and

115
00:11:19,839 --> 00:11:24,470
maybe some old experiments will be repeated
for our expedition.

116
00:11:24,470 --> 00:11:29,160
Now you've been to the International Space
Station before on your first flight.

117
00:11:29,160 --> 00:11:33,689
Tell me what it is you are looking forward
to about seeing or doing when you get back

118
00:11:33,689 --> 00:11:34,800
this time.

119
00:11:34,800 --> 00:11:38,709
Well, first of all I want to see the Cupola.

120
00:11:38,709 --> 00:11:49,550
I've heard a lot about it, I've seen it
here in Building 9, but physically I wasn't

121
00:11:49,550 --> 00:11:50,550
inside of it.

122
00:11:50,550 --> 00:11:55,490
I want to see it, I want to see the world,
the planet, from the other side, from a different

123
00:11:55,490 --> 00:11:56,649
point of view.

124
00:11:56,649 --> 00:12:04,459
Also, there are new Russian modules, new U.S.
modules, which have expanded the space within

125
00:12:04,459 --> 00:12:09,589
the station, within the ISS.

126
00:12:09,589 --> 00:12:17,399
I understand that the crew has a little more
difficulty living there because there is more

127
00:12:17,399 --> 00:12:24,689
space, you have to clean it, more space to
service, but on the other side it's better

128
00:12:24,689 --> 00:12:32,269
because we can breathe more freely, there's
more space and we don't feel so stuck in

129
00:12:32,269 --> 00:12:34,279
a small space.

130
00:12:34,279 --> 00:12:37,569
You mentioned Building 9, that's a place
here at the Johnson Space Center where there

131
00:12:37,569 --> 00:12:41,200
are mockups of station equipment where you've
trained for the mission.

132
00:12:41,200 --> 00:12:46,600
You've been training with a crew member
that you flew with before—you and Tom Marshburn

133
00:12:46,600 --> 00:12:52,490
were actually on the station together back
in 2009 when his shuttle flight visited while

134
00:12:52,490 --> 00:12:53,490
you were there.

135
00:12:53,490 --> 00:13:02,860
Has the experience of having flown with somebody
help you as you get prepared for this flight?

136
00:13:02,860 --> 00:13:11,829
I think from the very first days when we trained
together for Expedition 34/35, it seemed like

137
00:13:11,829 --> 00:13:13,290
we never parted.

138
00:13:13,290 --> 00:13:21,130
The people that I had met in 2009, it was
Kevin Ford and Tom Marshburn, I met with them

139
00:13:21,130 --> 00:13:25,430
on station.

140
00:13:25,430 --> 00:13:30,930
These people already know who they're working
with and we've remained good friends on

141
00:13:30,930 --> 00:13:37,600
good terms from those times, and so now we've
prepared and we're training for this specific

142
00:13:37,600 --> 00:13:38,600
flight.

143
00:13:38,600 --> 00:13:43,970
So I think it's a great benefit for our
crew in that it's made out of people who

144
00:13:43,970 --> 00:13:51,119
have already flown, veterans in flight, and
it's a great advantage to have us all have

145
00:13:51,119 --> 00:13:55,079
had already this experience on station together.

146
00:13:55,079 --> 00:13:59,269
Any time you fly in space you're going to
miss certain things that happen on Earth.

147
00:13:59,269 --> 00:14:03,529
On your upcoming flight you're going to
be in space for the Christmas and New Year's

148
00:14:03,529 --> 00:14:04,529
holidays.

149
00:14:04,529 --> 00:14:06,750
What are your thoughts about being in space
for those events?

150
00:14:06,750 --> 00:14:14,751

Well, I haven’t thought about that yet but
I think it will be a big adventure, a big

151
00:14:14,751 --> 00:14:16,790
moment in our space life.

152
00:14:16,790 --> 00:14:26,029
And we’ll be dressing up, we’ll be decorating
the station, we’ll put up a Christmas tree,

153
00:14:26,029 --> 00:14:33,829
maybe we’ll have some presents that will
arrive on the cargo vehicles, which of course

154
00:14:33,829 --> 00:14:41,950
will make us very happy and will support us
during this evening, this special time.

155
00:14:41,950 --> 00:14:57,510
Before, it happened that all three of our
crew members—there was Frank De Winne, Robert

156
00:14:57,510 --> 00:15:03,379
Thirsk—they both had birthdays during our
flight, and now it’s a little bit different,

157
00:15:03,379 --> 00:15:08,509
we’re flying in the wintertime and the crew
and I were born in August so we’re skipping

158
00:15:08,509 --> 00:15:12,949
our holiday, our birthdays, but we’ll be
celebrating other holidays including Christmas

159
00:15:12,949 --> 00:15:14,570
and New Year.

160
00:15:14,570 --> 00:15:17,430
Let me ask you to set the stage for me.

161
00:15:17,430 --> 00:15:22,930
Tell me about the International Space Station
as it exists now: what modules and different

162
00:15:22,930 --> 00:15:26,149
facilities are there that you'll be working
with?

163
00:15:26,149 --> 00:15:29,240
Tell us about the place that you are going
to.

164
00:15:29,240 --> 00:15:33,720
Well, the station is quite impressive.

165
00:15:33,720 --> 00:15:38,980
I think not everyone can have an idea of what
it looks like unless they are there.

166
00:15:38,980 --> 00:15:39,980
It's huge.

167
00:15:39,980 --> 00:15:50,179
The space inside allows about 13, 14, even
15 people to comfortably coexist within it.

168
00:15:50,179 --> 00:15:57,499
Even during our flight, when the station was
a third less than it is now, crew members

169
00:15:57,499 --> 00:16:01,230
could work in different modules and would
only see each other in the evening over a

170
00:16:01,230 --> 00:16:03,399
cup of tea.

171
00:16:03,399 --> 00:16:08,879
Now the station is even bigger so I think

we'll have to reacquaint ourselves with

172
00:16:08,879 --> 00:16:13,690
the other remaining modules which we haven't seen before.

173
00:16:13,690 --> 00:16:17,999
Specifically about the Russian segment, there is MRM [mini research module] 1 [Rassvet],

174
00:16:17,999 --> 00:16:25,850
it arrived right after I departed from station in 2009, I haven't seen it yet.

175
00:16:25,850 --> 00:16:29,939
I'm expecting to see ATV [Automated Transfer Vehicle] which will possibly be docking during

176
00:16:29,939 --> 00:16:39,389
the end of our flight, and a bunch of different Progresses which we'll have to unpack and

177
00:16:39,389 --> 00:16:42,040
then load back again.

178
00:16:42,040 --> 00:16:54,079
As for the U.S. segment, there is Node 3, there is

179
00:16:54,079 --> 00:17:00,089
the Cupola, and an additional module that arrived on shuttle, it is permanently docked

180
00:17:00,089 --> 00:17:02,079
to station now.

181
00:17:02,079 --> 00:17:06,970
It's a big cargo module.

182

00:17:06,970 --> 00:17:10,839
There is a lot to see, and there are a lot
of places to work.

183
00:17:10,839 --> 00:17:16,890
And then all the other, the laboratories and
the robotic arm, there are all kinds of things

184
00:17:16,890 --> 00:17:20,540
to, for you guys to play with when you're
there.

185
00:17:20,540 --> 00:17:28,920
Yes, that's, our main task is to service
the station, all of the systems, and to do

186
00:17:28,920 --> 00:17:32,080
all of the science experiments there so we
will be touching everything.

187
00:17:32,080 --> 00:17:33,920
Let's talk about the science.

188
00:17:33,920 --> 00:17:38,780
Because the assembly of the station is pretty
much complete now, the emphasis for the crew

189
00:17:38,780 --> 00:17:40,930
members is on the science research.

190
00:17:40,930 --> 00:17:47,010
In general, how do you explain to people what
the potential is for what we may be able to

191
00:17:47,010 --> 00:17:50,620
learn from the work that's being done on
the station now?

192
00:17:50,620 --> 00:18:00,590
Well, the main idea, of course, is to use

all the potential of a zero gravity of space

193
00:18:00,590 --> 00:18:07,240
and also the various factors of spaceflight
to test various materials and products, maybe

194
00:18:07,240 --> 00:18:08,240
test some medicines.

195
00:18:08,240 --> 00:18:21,510
Also, the idea is to see how the space factor
affects not only the different experiments,

196
00:18:21,510 --> 00:18:27,940
the different materials, but to see how it
affects us, real living humans, how it affects

197
00:18:27,940 --> 00:18:38,770
our bodies, how space affects us as we are
living in flight, in space, for a long period

198
00:18:38,770 --> 00:18:39,770
of time.

199
00:18:39,770 --> 00:18:41,690
Why do we do this?

200
00:18:41,690 --> 00:18:51,070
We do this to gain a lot of experience to
prepare for subsequent flights, more long-duration

201
00:18:51,070 --> 00:18:53,380
flights to other planets.

202
00:18:53,380 --> 00:18:57,570
Specifically we're talking about Mars now,
maybe we'll be returning back to the moon

203
00:18:57,570 --> 00:18:59,580

again, too.

204
00:18:59,580 --> 00:19:07,480
But if you look back 30 to 40 years ago, people were not able to regain their strength so

205
00:19:07,480 --> 00:19:13,810
quickly after flight, and at that time the long-duration flight was just a month.

206
00:19:13,810 --> 00:19:16,380
Now half a year is decent.

207
00:19:16,380 --> 00:19:23,130
We can fight and prevent all the different conditions that a human can experience after

208
00:19:23,130 --> 00:19:26,790
human flight.

209
00:19:26,790 --> 00:19:35,520
So now we are fully ready to spend half a year in space and return to our normal state

210
00:19:35,520 --> 00:19:38,930
within a short period of time to go on to subsequent flights.

211
00:19:38,930 --> 00:19:42,440
So that’s the general idea.

212
00:19:42,440 --> 00:19:44,910
There are different kinds of experiments on station.

213
00:19:44,910 --> 00:19:52,760
We study the atmosphere, the surface of the Earth.

214

00:19:52,760 --> 00:19:57,980
I won’t say that we’re studying other
planets because they are really far away from

215
00:19:57,980 --> 00:20:10,740
us just like from Earth, so for us the key
is the atmosphere, the ocean, the forests,

216
00:20:10,740 --> 00:20:15,622
plankton, fish, icebergs, glaciers, which
depending on the general temperature, the

217
00:20:15,622 --> 00:20:24,120
average temperature of the planet, may be
melting or may remain for a long time on mountaintops.

218
00:20:24,120 --> 00:20:32,890
There are different experiments with growing
biocrystals because here on Earth it is impossible

219
00:20:32,890 --> 00:20:41,190
to grow perfect crystal because it is not
the correct shape as it should have been.

220
00:20:41,190 --> 00:20:42,410
There are very different experiments.

221
00:20:42,410 --> 00:20:47,860
They take up most of the time of our flight.

222
00:20:47,860 --> 00:20:54,620
As you mentioned, one area of special concentration
is to find out how the human body responds

223
00:20:54,620 --> 00:21:01,320
to being in that environment, and to find
ways to counteract those negative effects.

224
00:21:01,320 --> 00:21:06,570
Can you give me two or three examples of the

kinds of experiments in this area that you're

225
00:21:06,570 --> 00:21:09,320
going to be working on during this mission?

226
00:21:09,320 --> 00:21:17,830
Well, there are several experiments, it's
called Tipologia and another experiment called

227
00:21:17,830 --> 00:21:23,550
Pilot—I can't even find an appropriate
translation of the terms.

228
00:21:23,550 --> 00:21:31,850
The experiments take a long time, and a lot
of preparation goes into these experiments.

229
00:21:31,850 --> 00:21:37,490
For example, the crew member has to undress
himself completely, attach a bunch of different

230
00:21:37,490 --> 00:21:43,990
sensors to his body, he puts a special cap
on his head with other sensors that controls

231
00:21:43,990 --> 00:21:53,580
the activity of various neurons within the
brain; basically it monitors the brain activity.

232
00:21:53,580 --> 00:21:59,880
The problem is that experiments are very interesting,
they are very interesting for science and

233
00:21:59,880 --> 00:22:04,380
for medicine, but we have to do these experiments
every month.

234
00:22:04,380 --> 00:22:11,880
We fly for half a year, so that means six
times per increment we do these experiments.

235
00:22:11,880 --> 00:22:17,660
It is difficult to prepare for the experiment
because while you're putting on one sensor,

236
00:22:17,660 --> 00:22:20,660
another sensor flies off.

237
00:22:20,660 --> 00:22:24,870
All these sensors are attached to a specific
computer, there is software that monitors

238
00:22:24,870 --> 00:22:31,960
the activity of the sensors, monitors the
signals coming in, all the signals are gathered,

239
00:22:31,960 --> 00:22:40,290
and while all this is happening we have to
do physical work, intellectual work, and some

240
00:22:40,290 --> 00:22:41,290
tasks.

241
00:22:41,290 --> 00:22:47,720
For example, we have to manually dock a cargo
vehicle, or just play some simple games on

242
00:22:47,720 --> 00:22:57,930
the computer; we have to activate all of our
cerebral functions.

243
00:22:57,930 --> 00:23:01,800
And while we're doing this we have to be
completely focused.

244
00:23:01,800 --> 00:23:09,590
All this information is read off of a computer
and we see this little green space that shows

245

00:23:09,590 --> 00:23:16,130
us that if we've relaxed and stopped thinking,
the green space gets a lot smaller.

246
00:23:16,130 --> 00:23:21,110
Once you start thinking actively, calculating
something, then this green space expands and

247
00:23:21,110 --> 00:23:24,720
this shows that your brain is working hard.

248
00:23:24,720 --> 00:23:30,660
Then all of this information that is collected
over an hour, an hour and a half, on the computer,

249
00:23:30,660 --> 00:23:38,250
all this information is downlinked to the
ground, and then analysts can already analyze

250
00:23:38,250 --> 00:23:43,690
how all this affects us in spaceflight, how
it affects our brain and our bodies.

251
00:23:43,690 --> 00:23:50,520
Well, this is one of the examples of such
an experiment, which I think is one of the

252
00:23:50,520 --> 00:23:51,960
most difficult ones.

253
00:23:51,960 --> 00:23:58,360
You've been in space so you're had the
personal experience of what that environment

254
00:23:58,360 --> 00:24:00,620
does to people.

255
00:24:00,620 --> 00:24:06,660
From your point of view, what is it that we
need to do to maximize the chances that people

256
00:24:06,660 --> 00:24:13,370
are going to be able to be successful exploring
for long periods beyond Earth orbit?

257
00:24:13,370 --> 00:24:21,490
Well, I think we need to continue as we've
been doing, six people per increment.

258
00:24:21,490 --> 00:24:27,410
I think this will again maximize the number
of experiments that we do on station.

259
00:24:27,410 --> 00:24:31,290
Also this will facilitate the process of adapting
to space.

260
00:24:31,290 --> 00:24:38,890
It will help us develop skills that we'll
be able to use when flying to other planets.

261
00:24:38,890 --> 00:24:43,530
Space station's modules are filled with
some specialized equipment for science experiments

262
00:24:43,530 --> 00:24:47,690
in other disciplines besides human life sciences.

263
00:24:47,690 --> 00:24:52,590
Give me a couple of examples of the other
kinds of research that are also going to be

264
00:24:52,590 --> 00:24:56,180
taking up your time while you're in space
this time.

265
00:24:56,180 --> 00:25:07,090
I think another equally important experiment
is this: from the first flight day we prepare

266
00:25:07,090 --> 00:25:19,610
us for landing back on Earth, we have a lot
of special equipment to do exercises on station.

267
00:25:19,610 --> 00:25:26,480
This keeps us in a good physical shape that
we had before we arrived on station, but it

268
00:25:26,480 --> 00:25:31,510
also allows us to pump some iron, so to speak,
but the key is not to overdo it.

269
00:25:31,510 --> 00:25:36,460
There is TVIS [Treadmill Vibration Isolation
and Stabilization], ARED [Advanced Resistive

270
00:25:36,460 --> 00:25:41,730
Exercise Device], T2 [Treadmill 2], they're
all great devices that helps us keep our physical

271
00:25:41,730 --> 00:25:50,470
shape in space.

272
00:25:50,470 --> 00:25:56,720
If everything goes as the medics have planned,
everything should be OK because there's

273
00:25:56,720 --> 00:25:59,750
an individual approach for each astronaut.

274
00:25:59,750 --> 00:26:00,960
It's a little bit different.

275
00:26:00,960 --> 00:26:09,460
We have specific instructions to do exercises
on station and if we retain our shape up until

276
00:26:09,460 --> 00:26:14,910
the last minutes of our flight and we feel

ourselves, we feel pretty well when we land.

277
00:26:14,910 --> 00:26:20,530
Even if we don’t, we regain our physical
shape quickly afterwards.

278
00:26:20,530 --> 00:26:27,130
We do this work to keep our body in a good
shape throughout and so that we feel good

279
00:26:27,130 --> 00:26:34,310
when we arrive back on Earth.

280
00:26:34,310 --> 00:26:40,520
This also keeps our bones under the right
load, under the right pressure.

281
00:26:40,520 --> 00:26:46,890
Before, when cosmonauts would arrive back
on Earth, the physical exercise that they

282
00:26:46,890 --> 00:26:59,960
did do didn’t help keep the strength of
the structure of the body, so after flight

283
00:26:59,960 --> 00:27:03,100
they didn’t recommend us to do any physical
exercises.

284
00:27:03,100 --> 00:27:12,090
For example, they said we weren’t allowed
to jump with a parachute or go mountain skiing.

285
00:27:12,090 --> 00:27:13,590
Now it’s different.

286
00:27:13,590 --> 00:27:18,450
Practically, just a few months afterwards
we can do this because the bones are strong.

287
00:27:18,450 --> 00:27:23,660
Along with all of this science work that you
and your crewmates are going to do, you're

288
00:27:23,660 --> 00:27:28,610
also the people who are charged with the responsibility
of taking care of the station to make sure

289
00:27:28,610 --> 00:27:30,810
that it can keep flying.

290
00:27:30,810 --> 00:27:36,120
What other kinds of work do International
Space Station crew members have to do outside

291
00:27:36,120 --> 00:27:38,590
of the science experiments?

292
00:27:38,590 --> 00:27:41,910
What else do you do during your day?

293
00:27:41,910 --> 00:27:48,070
That's a great question.

294
00:27:48,070 --> 00:27:52,960
Each crew member can set up his day differently.

295
00:27:52,960 --> 00:28:01,350
For example, one crew member, after they do
several tasks of the work plan, can take a

296
00:28:01,350 --> 00:28:11,240
break and watch a movie, they can speak with
the ground using a special channel for talking

297
00:28:11,240 --> 00:28:13,150
with family, with friends.

298

00:28:13,150 --> 00:28:16,140
Some people write emails or letters.

299
00:28:16,140 --> 00:28:22,180
Others like to do additional experiments,
additional work, but I think something that

300
00:28:22,180 --> 00:28:35,150
we all enjoy doing is just looking at Earth,
taking pictures of the Earth, taking photographs

301
00:28:35,150 --> 00:28:45,700
of various processes, movements on Earth,
and just to soak in the beauty of the Earth.

302
00:28:45,700 --> 00:28:53,150
This is something that practically all of
us do with some of our free weekend time,

303
00:28:53,150 --> 00:29:00,290
but then of course there is time to speak
with Earth, take some pictures.

304
00:29:00,290 --> 00:29:06,130
Some people have a task list of additional
experiments that we don’t actually have

305
00:29:06,130 --> 00:29:09,930
to do but that we can do.

306
00:29:09,930 --> 00:29:23,020
Whenever we have a time, we try to do this
task list just to add some variety to our

307
00:29:23,020 --> 00:29:24,430
weekend.

308
00:29:24,430 --> 00:29:31,050
Even during the week you have other tasks
to do, and the plan for your increment has

309
00:29:31,050 --> 00:29:37,360
to be flexible to take into account things
that are unexpected that crop up.

310
00:29:37,360 --> 00:29:42,520
That includes the possible need for you to
go outside to do spacewalks.

311
00:29:42,520 --> 00:29:49,460
Right now, is there a plan for a spacewalk
during your time?

312
00:29:49,460 --> 00:29:59,200
I have been preparing, even a week ago I was
preparing for my EVA, for my spacewalk, to

313
00:29:59,200 --> 00:30:04,480
do the installation of some experiments outside
the station.

314
00:30:04,480 --> 00:30:06,450
All this is hard work.

315
00:30:06,450 --> 00:30:10,400
Also I’m supposed to collect information
from other experiments that were installed

316
00:30:10,400 --> 00:30:11,790
outside the station.

317
00:30:11,790 --> 00:30:21,990
But it seems that this EVA will be pushed
a little bit

318
00:30:21,990 --> 00:30:25,320
to the right.

319
00:30:25,320 --> 00:30:30,160

Basically this is done because practice has
shown that it’s not a good idea to have

320
00:30:30,160 --> 00:30:36,070
crew members do spacewalks a few weeks prior
to departing back for Earth.

321
00:30:36,070 --> 00:30:41,750
So the plan is now to have the next crew member
do that spacewalk, which is unfortunate because

322
00:30:41,750 --> 00:30:45,690
last time I was unable to do a spacewalk.

323
00:30:45,690 --> 00:30:52,900
There were no plans to do it, and this time
I was really excited to be able to do my EVA,

324
00:30:52,900 --> 00:31:01,340
but now it seems that as of today at least
I won’t be doing that because the spacewalk

325
00:31:01,340 --> 00:31:02,340
was moved.

326
00:31:02,340 --> 00:31:05,740
But you’ll be ready to go if asked?

327
00:31:05,740 --> 00:31:09,010
I’m always ready.

328
00:31:09,010 --> 00:31:15,760
It’s really a shame because I trained a
lot here in the Neutral Buoyancy Lab, and

329
00:31:15,760 --> 00:31:26,140
even from 2002 I began preparing and training
but the program changed, so unfortunately

330

00:31:26,140 --> 00:31:33,280
I wasn’t able to do some tasks on the U.S.
segment.

331
00:31:33,280 --> 00:31:38,390
Again, this has happened the second time,
the second increment where there are no EVAs,

332
00:31:38,390 --> 00:31:40,860
but we’ll do what we can.

333
00:31:40,860 --> 00:31:46,580
This space station is receiving supplies from
the Earth in a small fleet of unmanned cargo

334
00:31:46,580 --> 00:31:51,210
ships, and there are a few of them that are
scheduled to be coming and going during your

335
00:31:51,210 --> 00:31:52,900
time up there.

336
00:31:52,900 --> 00:31:58,950
Tell me about the different ships that are
bringing supplies to the station now, including

337
00:31:58,950 --> 00:32:04,750
the two American commercial ships that may
be arriving during the time you’re in space

338
00:32:04,750 --> 00:32:06,790
as well.

339
00:32:06,790 --> 00:32:13,210
I didn’t mention this before but we are
looking forward to those moments when the

340
00:32:13,210 --> 00:32:21,020
two commercial vehicles will arrive, which,
the dockings are actually planned for our

341
00:32:21,020 --> 00:32:22,020
increment.

342
00:32:22,020 --> 00:32:37,390
I know that these vehicles will carry different
types of equipment, our clothes and our food,

343
00:32:37,390 --> 00:32:45,760
and so over the course of our increment two
commercial vehicles will dock.

344
00:32:45,760 --> 00:32:50,500
About three cargo vehicles, Progress vehicles,
will dock.

345
00:32:50,500 --> 00:32:56,440
Also, there will be two Progresses already
docked when we arrive plus there will be ATV,

346
00:32:56,440 --> 00:33:03,650
which is the European cargo vehicle, so if
all of this happens we'll be very busy for

347
00:33:03,650 --> 00:33:06,860
the whole duration of our flight.

348
00:33:06,860 --> 00:33:14,480
The whole landscape of space flight has actually
changed a lot in the last few years, because

349
00:33:14,480 --> 00:33:19,630
now you've got private companies flying
cargo to space and different nations that

350
00:33:19,630 --> 00:33:23,690
are working together instead of competing
with one another.

351

00:33:23,690 --> 00:33:30,200
Is that the kind of arrangement that you think
is going to continue as human beings continue

352
00:33:30,200 --> 00:33:39,060
to try to explore space and go beyond Earth
orbit?

353
00:33:39,060 --> 00:33:48,050
I think that the space agencies will not miss
an opportunity to move forward, to just trample

354
00:33:48,050 --> 00:33:53,940
on the ground here on Earth, but they'll
continue expanding forward.

355
00:33:53,940 --> 00:34:04,390
As for commercial programs or space tourists,
there is some rumors going around that possibly

356
00:34:04,390 --> 00:34:09,139
there'll be a commercial tourist from the
Russian side, someone who will participate

357
00:34:09,139 --> 00:34:15,129
in space flight, but right now it's all
in the planning stages and I think our agencies

358
00:34:15,129 --> 00:34:22,710
will continue looking into this question,
see how it turns out.

359
00:34:22,710 --> 00:34:28,509
Because right now we're flying half a year,
there is a constant rotation, those who arrive

360
00:34:28,509 --> 00:34:34,099
on their vehicles depart on their vehicles
and there is no opportunity to arrive on a

361

00:34:34,099 --> 00:34:42,769
different vehicle—take a taxi, so to speak—in
order to be able to have a rotation of tourists.

362
00:34:42,769 --> 00:34:46,299
So we'll see; time will tell.

363
00:34:46,299 --> 00:34:53,190
The point of sending people into space, in
part at least, is to prepare us for exploration

364
00:34:53,190 --> 00:34:54,690
that will go on in the future.

365
00:34:54,690 --> 00:34:59,779
You've been there so, Roman, tell me what
is it that you, that you know that we are

366
00:34:59,779 --> 00:35:05,329
learning from sending people to the International
Space Station that is helping us prepare for

367
00:35:05,329 --> 00:35:13,700
the deep space explorations
to come?

368
00:35:13,700 --> 00:35:23,309
In 2009, when we flew the first time, that
was the first time when there was a six-crew

369
00:35:23,309 --> 00:35:24,319
group on station.

370
00:35:24,319 --> 00:35:32,690
It was an experiment, a major experiment,
but it proved that everything was good, we

371
00:35:32,690 --> 00:35:40,509
had good relationships among the crew members,
and this happened because we were both prepared

372
00:35:40,509 --> 00:35:46,289
well for flight and also because we were psychologically
compatible.

373
00:35:46,289 --> 00:35:53,300
We were stable and up to this day we've
remained on good terms with the cosmonauts

374
00:35:53,300 --> 00:36:01,200
and the astronauts that we flew together.

375
00:36:01,200 --> 00:36:11,010
I think these types of flights give humanity
a lot to think about.

376
00:36:11,010 --> 00:36:19,809
We learned to work together jointly with different
nations, different people, all in one boat.

377
00:36:19,809 --> 00:36:21,299
This is very useful.

378
00:36:21,299 --> 00:36:25,859
Again it's preparation for longer flights
to other planets.

379
00:36:25,859 --> 00:36:34,520
If everything is going well, if we're able
to successfully follow the program, the flight

380
00:36:34,520 --> 00:36:40,720
program, even while orbiting Earth, with this
rich experience we'll be able to reach other