if you would for the NASA audience just
share with us what your background is

education where you went to school what
you studied ultimately what you did as a
career and then how you came to become
an astronaut

University in Minnesota where I got a

bachelor's degree in physics I was in

ROTC program so immediately after

graduation I became an active duty army

officer served as a combat engineer and

then a certain point in my career I got
the opportunity to go to graduate school

so I got a master's in applied physics

from Stanford University used that to
teach physics at the in the physics

department actually it's the Department

of while they're gonna be mad at me if

I'm in department of physics and nuclear
engineering good in at West Point and

after that was done I in that process I

I had studied space physics so I got

very interested in in that and

transitioned to becoming a Space

Operations Officer for the army which

led to me being invited to work at NASA
as one of as kind of an experiment and

having a an active duty Army officer

working in the astronaut office awesome

and I got to know a lot of astronauts I

really enjoyed working with them and and

because of that was really inspired to

apply yeah because of the combination of

physical challenges and mental

challenges and I was fortunate enough to

get hired in 2009 to be so for a lot of

people that are watching maybe they're

not familiar with what a combat engineer

is can you share with us what that is


sure a combi Janiero is helps out with

44
00:01:39,118 --> 00:01:44,250
ground tactical units with providing

45
00:01:42,868 --> 00:01:46,250
making sure they have mobility for it so

46
00:01:44,250 --> 00:01:48,629
for example if you run into an obstacle

47
00:01:46,250 --> 00:01:49,469
then we try to help break through those

48
00:01:48,629 --> 00:01:51,899
obstacles

49
00:01:49,469 --> 00:01:54,030
there's also survivability we support

50
00:01:51,899 --> 00:01:57,780
where for example if we're setting up a

51
00:01:54,030 --> 00:02:00,030
big defensive area we can help harden

52
00:01:57,780 --> 00:02:01,349
the position to try to protect soldiers

53
00:02:00,030 --> 00:02:03,269
from so you're making real-time

54
00:02:01,349 --> 00:02:05,578
decisions that are life-and-death in

55
00:02:03,269 --> 00:02:07,019
critical moments is that is that safe to

56
00:02:05,578 --> 00:02:10,079
say that's safe to say for any military

57
00:02:07,019 --> 00:02:11,568
officers or absolutely awesome Joe give
us a little bit about your background

education where you went to school

and ultimately your career and then on

to the astronaut corps sure so I'm a

Southern California kid and went to

school University of California Santa Barbara then off to get a masters at the

University of Arizona both in geology so

I'm I'm a rock guy good and worked a bunch of different jobs while I was at

school

I was in the US Marine Corps Reserves

worked as a hydrogeologist managed the

research center out in the Bahamas but
before I became an astronaut I was actually a high school and middle school teacher and so in 2004 NASA wanted to hire some educators to become teachers and I was one of the lucky three they got selected awesome so you obviously spent a lot of time on the space station talking to young folks I presume yes was that was that one of your duties it is it's all you know one of all of our duties while we're up there is just to share what we're doing with school teacher you kind of gauge what you do by
looking at your students you know they are bored are they falling asleep are they engaged but while you're in space and you're doing one of these downlinks you can't see them peso it's hard because they can see you they're gonna see you floating they can see you float in doing all that but you can't see them and that's probably the most challenging part I'm pretty sure you kept their attention I think we did all right feedback we got is that work yeah well great well I have some questions I sent out a tweet yesterday asking people if
they had the opportunity to ask you any

00:03:43,159 --> 00:03:47,359
questions what would those questions be

00:03:45,709 --> 00:03:49,789
and I have a number of questions here

00:03:47,359 --> 00:03:54,620
from from some of the folks that follow

00:03:49,789 --> 00:03:56,479
NASA and I'll just start with with one

00:03:54,620 --> 00:03:58,849
here that I think will be pretty easy

00:03:56,479 --> 00:04:02,149
for you guys to answer what do

00:03:58,849 --> 00:04:04,219
astronauts do in the Soyuz capsule while

00:04:02,150 --> 00:04:06,469
you're on your way to to joining the

00:04:04,219 --> 00:04:10,310
International Space Station we

00:04:06,469 --> 00:04:11,959
double-check everything the the Soyuz

00:04:10,310 --> 00:04:14,659
spacecraft does a lot of things

00:04:11,959 --> 00:04:17,988
autonomously and we have to double check

00:04:14,659 --> 00:04:19,728
the that it's working well and it's also

00:04:17,988 --> 00:04:22,339
got a lot of redundant systems which for
Space Flight is very important so we're ready and trained so that if one of those automatic systems fails we can take over those things.

how much time did you have from the time you launched until you docked for the flight that Jo and I were on it was six hours okay and is that common or uncommon it sometimes it takes multiple days right yeah my first flight with the Russians it was a two-day rendezvous and so it all depends on the orbital dynamics where's the space station when you launch so I think we enjoyed two six
hours because the Soyuz is small and you can imagine the three of us in that capsule for you know two days it's a long time so you're ready to get to the ISS I can imagine another question is how long did it take you to get used to 1g once you got back I think it varies for everyone for me the hardest part is my vestibular system the balance where the first 20 hours if I stood up I was not feeling too good muscle wise and you know strength it was pretty good but after a day you know I got better but it's it's amazing what
the body does and how quickly it

recover where it's just you know almost

every minute you're getting better and

better so were you able to walk I can

walk with a little bit of assistance

okay yeah it's just you know you turn

your head and you feel like you know the

floor is moving if you can imagine being

on a boat all day sure and when you get

off the boat and you kind of stand there

you can still feel kind of the waves

underneath you it's it's kind of like

that but just a little more extreme got

it how about you mark I felt pretty good

that but just a little more extreme got
like Joe mentioned I'd certainly had the
feeling that things weren't working
quite as the way they normally would and
the biggest issue for me was a lot of
soreness in the smaller muscles that
help us balance and I could feel that
even just sitting up in bed was so what
was your first meal when you got back
and how long did it take before you were
ready to eat I was ready to right away
oh he's always ready to yeah my my mom
might be mad at me if I said this is my
first meal because it was chips and
guacamole though on the plan well you
deserved it Thanks it tasted good it's
always amazing yeah chips and guacamole

what was your first meal so we had some

you know small snacks on the

on the plane but the meal I asked for

when I got back because I was not going

home to mom's cooking right away was to

have some local oxtail it was it was

tasty is that right oxtail that's an

interesting choice yeah fantastic okay

so another question what is the least

known fact about the ISS and Mark I'll

let you go first

I'd say it's the amount of science

experiments we're doing for Joe and I we
were up on the space station for 168 days and in that time period there was 284 roughly experiments that happened while we were there so there's a incredible amount of science is going on a lot of it without us even having to interact with it awesome yeah you know I think people don't realize that we have had you know humans astronauts on the space station for the last 18 years 24/7 365 living in this self-contained environment so you can imagine you know the recycling we do here on earth the natural and the the man-made we recycle
pretty much everything we can up there

awesome as far as space debris I've got

a question here folks are interested in

can you see it from space and and what

do you do about it well hopefully we

won't see it if it's big enough that we

can see it we'll try to go ahead and

change the orbit of the space station so

people are tracking that for us and we

can actually do that and it probably

happens a few times a year that that

will change the orbit for objects that

are large the the smaller objects we see

evidence of that if you go out and do a

evidence of that if you go out and do a
spacewalk you might see a ding on a

00:08:15.410 --> 00:08:20.810
handrail we have the cupola which is the

00:08:18.529 --> 00:08:22.579
big window that we look out of and you

00:08:20.810 --> 00:08:24.860
can see where that has been struck

00:08:22.579 --> 00:08:26.269
before luckily it's a strong window it's

00:08:24.860 --> 00:08:27.620
a strong window a little bit bigger but

00:08:26.269 --> 00:08:29.899
it almost looks like it would look on

00:08:27.620 --> 00:08:32.539
your car when you get a little piece of

00:08:29.899 --> 00:08:35.569
rock that hit your window awesome did

00:08:32.539 --> 00:08:36.918
you see any space debris I I saw the

00:08:35.570 --> 00:08:38.390
same evidence during spacewalks that

00:08:36.918 --> 00:08:40.699
Jill mentioned certainly looking out the

00:08:38.389 --> 00:08:42.799
cupola like he mentioned one other thing

00:08:40.700 --> 00:08:45.230
paolo nespoli an Italian astronaut that

00:08:42.799 --> 00:08:47.629
was on board with us during the first
half of our flight he took a lot of pictures and captured some natural space debris interacting with the atmosphere he actually saw the debris only when it started burning up and then can see the flash of light as it finally was completely burned up and is that is that video still out there somewhere I don't know if you surprised if it wasn't it is out there and it's pretty cool to see all right here's another question from one of our fans what is your favorite geological feature to look at and admire from the space station well
yeah so yeah as a geologist you know

it's just you're in heaven because now

you can see everything from a grand

scale so if we're talking geological

really enjoyed flying over Africa not

only can you see the different colors of

the different rock formations you can

see the dunes seeing mountain ranges I

mean there's just the earth is pretty

beautiful land you know it's hard to

pick out one because every time you look

out the window you see something new and

for me I think the wasn't so much a

ground certainly deserts deserts are
particularly impressive because the

there's less moisture in the air so you

get a better view through the atmosphere

of the desert the time that was

particularly impressive for me was

looking at the American West from I

could got a view all the way from Denver

when I looked later at the picture and

tried to map out what I was seeing I

could tell that I was seeing the lights

from Denver all the way to the lights of

Houston in one view Oh which is really

amazing particularly when the view was

at night under a full moon because the
full moon would light up some of those

00:10:22,450 --> 00:10:25,660
colors of the desert but you still got

00:10:24,129 --> 00:10:26,889
the little city lights to show where

00:10:25,659 --> 00:10:28,750
those people were and help you figure

00:10:26,889 --> 00:10:32,110
out what you're looking at so here's a

00:10:28,750 --> 00:10:35,169
question that is of interest but maybe

00:10:32,110 --> 00:10:39,159
not serious what's it like to sneeze in

00:10:35,169 --> 00:10:40,809
zero-g and how do you do it away from

00:10:39,159 --> 00:10:45,279
everybody away from everybody else there

00:10:40,809 --> 00:10:47,799
you go is there I would imagine

00:10:45,279 --> 00:10:49,929
sanitation on the ISS as critically

00:10:47,799 --> 00:10:52,329
important can you share some of your

00:10:49,929 --> 00:10:54,879
experiences with getting ready to go fly

00:10:52,330 --> 00:10:56,889
and then ultimately being on the ISS and

00:10:54,879 --> 00:10:59,409
some of those things we do go into
quarantine a couple of weeks before we launch to make sure we don't take anything up with us and one of the great things about up there is that you know once you get there you're in a pretty good and sterile in environment in terms of you know cold and the flu and so we missed the flu season while we were up there and but it takes a lot of work not only protecting us before we get there but we spend a lot of time cleaning up the space station as well there's weekly housecleaning on the space station just
like you would do at home I can imagine
every Saturday morning got to clean the
space actually Ming and wiping down
things absolutely yeah as a as a Navy
guy myself being on a ship critically
important to keep everything as clean as
possible because if one person gets sick
everybody gets sick and it happens fast
I would imagine on the ISS that's every
bit as true whether there's three crew
or six mm-hmm that's great
another question is a question and a
number of these just launched when you
launch on a Soyuz what's it like what's
the jolt like is it smooth is it harsh

what's it feel like when you launch on a Soyuz or do you even remember much of it

I definitely remember the lunch we train so much in a simulator that did a really good job of getting us used to that small space that because it was so smooth I was a little disappointed that it wasn't gonna give me a better story out of it okay I had a little window over here and certainly the view out that window was different for the simulator but it was kind of hard to get at most the time it was just the
blackness of space so and the one thing

00:12:30,250 --> 00:12:33,340
that was very different was when we went

00:12:31,720 --> 00:12:35,350
from one stage of the rocket to the next

00:12:33,340 --> 00:12:37,120
stage there be momentary stopping of

00:12:35,350 --> 00:12:39,670
that acceleration which felt like a jolt

00:12:37,120 --> 00:12:41,259
forward so that that was shocking as we

00:12:39,669 --> 00:12:43,629
changed it but otherwise it was very

00:12:41,259 --> 00:12:45,789
very smooth yeah until we got to the

00:12:43,629 --> 00:12:48,009
space station and it's a funny story

00:12:45,789 --> 00:12:49,659
marking about my yeah if you're

00:12:48,009 --> 00:12:51,129
approaching so where you know you go

00:12:49,659 --> 00:12:52,629
through the whole launch sequence you

00:12:51,129 --> 00:12:54,789
have a few hours like Mark said you're

00:12:52,629 --> 00:12:56,710
just checking out the systems and then

00:12:54,789 --> 00:12:59,409
you start to approach the space station
and you get your first glimpse out the window of this beautiful you know laboratory that that we've built and then marked which just happens to be at the same time as the commander who's looking at the space station through his periscope it's a very intense time for him because we're approaching another spacecraft and he's got to be very ready to respond to a failure of the automatic system because he has to do it manually possibly and me so it's very intense for him and I'm trying to support him all the time.
I get this view of these massive solar arrays out the window and I was like wow he just looked at me and gave me we were hot mic so everybody could hear everything we're saying and I'm sure I was very excited yeah so how much do you sweat during all that this suit we're connected to a ventilation system okay so if we're sweating a lot it gets dried up as long as the suit systems working well we've had a lot of simulators where we sweated yeah a ton I think it's a lot easier I think real time just we've trained for so long and you're
ready for then yeah pretty prepared so

final question for both of you but both

of you have been educators in your day

and I got a question here from a fourth

did you use algebra when you're

up there how can you not use algebra

every day no matter what

you're doing there's algebra that's that

is involved awesome

yeah it's pretty important one of the

most important things I think that NASA

does in its mission is inspire young

people to learn science technology

engineering and math and of course it's

not just the the astronauts who are

00:14:25,470 --> 00:14:29,819
heroes that need to use these these

00:14:27,688 --> 00:14:33,028
skills it's also all the people that

00:14:29,818 --> 00:14:34,738
design and build and integrate these you

00:14:33,028 --> 00:14:37,139
know amazing capabilities for our

00:14:34,739 --> 00:14:39,028
country and for the world so I just want

00:14:37,139 --> 00:14:40,259
to thank you both for being here thank

00:14:39,028 --> 00:14:43,168
you for your service to this country

00:14:40,259 --> 00:14:45,360
thank you for this your service to NASA

00:14:43,168 --> 00:14:47,338
it's one of the best parts of my job is

00:14:45,360 --> 00:14:50,159
getting to sit down and talk with folks

00:14:47,339 --> 00:14:53,279
like you you're both great Americans so

00:14:50,159 --> 00:14:55,048
mark VandeHei and joe acaba thank you

00:14:53,278 --> 00:14:56,629
for your service and it's good to be

00:14:55,048 --> 00:15:02,989
with you thank you sir
[Music]