00:00:00,050 --> 00:00:04,139
Aviation Week and space technology this

00:00:02,520 --> 00:00:06,839
is Mission Control Houston please call

00:00:04,139 --> 00:00:08,939
station for a voice check good morning

00:00:06,839 --> 00:00:10,830
station this is Mark Kuro with aviation

00:00:08,939 --> 00:00:15,298
week and space technology how do you

00:00:10,830 --> 00:00:17,850
hear me hi mark welcome aboard the

00:00:15,298 --> 00:00:19,980
International Space Station thank you

00:00:17,850 --> 00:00:21,510
I've got some questions I know you're

00:00:19,980 --> 00:00:24,089
both busy so I appreciate the

00:00:21,510 --> 00:00:26,250
opportunity I wonder if the two of you

00:00:24,089 --> 00:00:28,618
could discuss what the key challenges

00:00:26,250 --> 00:00:30,178
are for this third spacewalk as it's

00:00:28,618 --> 00:00:32,759
currently planned it seems like there's

00:00:30,178 --> 00:00:38,549
lots of cable and lots of space station
00:00:32,759 --> 00:00:40,590
real estate to deal with that's right

00:00:38,549 --> 00:00:42,449
mark we're continuing the cable theme

00:00:40,590 --> 00:00:44,219
that we had from the first to EV A's and

00:00:42,450 --> 00:00:46,350
this one we're going to lay down over

00:00:44,219 --> 00:00:48,058
400 feet of cable we're going to send

00:00:46,350 --> 00:00:49,530
two cables out to the left side of the

00:00:48,058 --> 00:00:52,140
station or port side and two to the

00:00:49,530 --> 00:00:53,489
right side or starboard side and these

00:00:52,140 --> 00:00:55,020
cables are going to attach to some

00:00:53,488 --> 00:00:57,359
antennas that are going to be used for

00:00:55,020 --> 00:00:58,890
the future American vehicles that are

00:00:57,359 --> 00:01:01,079
going to be docking bringing crew to the

00:00:58,890 --> 00:01:02,789
space station starting in a few years so

00:01:01,079 --> 00:01:04,290
we need to put these antennas and the
cables there for them and also some reflectors so they're onboard navigation systems that use lasers can see the reflectors and that way the spaceship will know where the station is and what orientation it's in and we'll be able to dock properly so there's a lot of moving from one end to the other of the station and a lot of equipment and hardware that we're going to be bringing out there in.

Terry I'd like to ask you if if you and the experts on the ground or any closer to identifying the source of the water in your spacesuit helmet after the
second spacewalk and how concerned you

44 00:01:36,180 --> 00:01:44,368
might be about embarking on a third

45 00:01:38,609 --> 00:01:46,049
space walk in the same space suit well

46 00:01:44,368 --> 00:01:48,478
you know to be honest I've been busy

47 00:01:46,049 --> 00:01:49,890
getting ready for the third spacewalk

48 00:01:48,478 --> 00:01:51,118
and I know a lot of specialists I've

49 00:01:49,890 --> 00:01:52,320
gotten some emails and talked to folks

50 00:01:51,118 --> 00:01:54,840
on the ground they're very busy

51 00:01:52,319 --> 00:01:56,069
analyzing the data this is something

52 00:01:54,840 --> 00:01:57,600
that we've seen before and I mentioned

53 00:01:56,069 --> 00:01:58,978
it yesterday when I noticed some water I

54 00:01:57,599 --> 00:02:02,039
said it might be the same issue it's

55 00:01:58,978 --> 00:02:03,658
happened a few times so it's something

56 00:02:02,040 --> 00:02:05,009
that it's possible that it's something

57 00:02:03,659 --> 00:02:07,020
that we've seen before but that's still

to be determined and I'm sure that NASA
is looking very intently at it and
they're going to have a good answer for
us here shortly as far as being
concerned I'm actually pretty happy with
this
it's got me out the door and back in
safely twice so I kind of like it and
and hopefully it's good and I can keep
on going out in the same one well it
sounds like if they can find a
satisfactory answer your your prime
you're ready to go on this one that's
right yeah butch and I will absolutely
be ready to go and it's just a question

the grounds going to make the decision

for us after looking at the data and I'm

completely confident I'm not going

outside and less we're sure that it's a

good shoot good suit okay and I'd like

to ask the both of you these series of

three spacewalks to reconfigure the

station for these commercial docking

port seems you know bigger than just the

just the work of putting the hardware in

place this is really sort of giving the

u.s. space program a new direction and I

just wonder what the two of you think
about the significance of this activity

that you've undertaken oh it's

absolutely huge significance it is

changing our capabilities of the

International Space Station we're

preparing for the future as we prepare

for as Terry said for these these us

vehicles to dock to the station right

now we've got the old shuttle docking

adapters and they're kind of big those

kind of docking adapters are big and

heavy and and these smaller vehicles

there's no reason to put that kind of

weight on them so the docking adapters
are different and so we put those
docking adapters on there like we said

they have to have power and getting that

docking adapters on there like we said

power to them this is our job are

working those cables to get it to it and

two spacewalks outside but it has been

literally years of planning engineers

training teams assessment teams

operational teams across our nation

doing much in preparation for this so

this is that this is a huge endeavor

you're absolutely right in that

assessment wonderful to of you could
give us a little insight and the sort of
physical demands even the mental demands
of doing this kind of work I listened
yesterday to the spacewalks and it
seemed like there was an awful lot of
coordination between the two of you
probably as much just looking at one
another is actually talking and also the
sort of support that you got from Samantha and
also on the ground from Joe LaCava and
kind of queueing you here and there to
to what was coming next and I just
wonder how important that sort of
teamwork is to accomplishing these goals

yeah that teamwork is absolutely vital

these goals don't get accomplished

these objectives do not happen without

the work of everybody coming together

and you know enjoy talking to us he's

just the voice of many people in the

background that are talking to him and

he's the conduit of communication to us

back and forth so there's many many

people on the ground that are assessing

you know real time making real time

changes to what's taking place and like

I said he's he's the one of the prime
ones and Samantha like you said Terry and Samantha work together to lube the arm yesterday and it would not have happened they got all the geta heads done and it would not have happened in our time allotted had not Samantha been exactly ready to start and do her part every single time so her part was vital as well and as far as the physical aspects i can tell you this there's not many things that i think that are more mentally and physically challenging simultaneously as doing a spacewalk like this with all the intricate details and
the various things and and there's no

00:05:42,370 --> 00:05:46,209
way that at least in my brain that i can

00:05:44,348 --> 00:05:48,610
mentally put it all together and make it

00:05:46,209 --> 00:05:49,899
happen alone that's why we need Joe and

00:05:48,610 --> 00:05:52,240
those ground teams feeding us

00:05:49,899 --> 00:05:54,009
information sometimes where a hand rails

00:05:52,240 --> 00:05:56,110
locate something as simple as that and

00:05:54,009 --> 00:05:57,759
it's like you said it's absolutely

00:05:56,110 --> 00:06:00,699
crucial to the success of any endeavor

00:05:57,759 --> 00:06:04,538
like this and what about the the

00:06:00,699 --> 00:06:07,120
physicality of it I I guess I'm really

00:06:04,538 --> 00:06:10,120
kind of wondering if you know you are

00:06:07,120 --> 00:06:12,340
your hands in need of more rester and

00:06:10,120 --> 00:06:14,110
your arms and all that or can you work

00:06:12,339 --> 00:06:15,759
in the spacesuits and do all the stuff
that's planned for the third space walk

without being you know cramped or or too

sore at the end yeah you are absolutely

sore and tired after a spacewalk the

good news is it seems like your body

heals a little bit quicker in space than

it does on earth but they give us a few

days off which are really important like

you said there's just deal your forearms

and your in your

your hand muscles but you are tired I've

done a few marathons on earth and half

marathons and the spacewalk is is

definitely takes a lot of energy out of
you we were talking to the doctors

yesterday just about our heart rates and

it's amazing the heart rate level and

the amount of physical work you do for

the six and a half hours we were outside

plus a couple hours beforehand in the

suit and about an hour afterwards in the

suit so it's a lot of work you're

absolutely right about the physical

aspect of a spacewalk okay yeah one

thing the one thing a lot of people

aren't aware of is that you know when

you're out in the vacuum of space it's

like literally almost 300 degrees and
and the place you can feel that is

writing in our fingertips when we're on

the you know on the Sun side of the

orbit and that heat you don't feel

degrees at your fingertips but you feel

warm that heat combined with a fatigue

inside those gloves really does wear on

those fingertips for a while but you

know when you come back in your

fingertips are all pink and white and

and discolored and and very very tender

and after the first spacewalk even your

fingernails feel like they get peeled

back a little bit and after the first
spacewalk it took about three days

00:07:44,129 --> 00:07:47,939
before they felt really normal and I

00:07:46,500 --> 00:07:49,740
told Terry I said I bet you after the

00:07:47,939 --> 00:07:51,120
second one will feel better and it that

00:07:49,740 --> 00:07:52,829
is indeed the case this morning I feel

00:07:51,120 --> 00:07:54,480
much better than I did the morning after

00:07:52,829 --> 00:07:56,339
the first one so just anyway just a

00:07:54,480 --> 00:07:58,650
little piece of information now that's

00:07:56,339 --> 00:08:02,669
very interesting it seems very physical

00:07:58,649 --> 00:08:04,979
my last question for you butch is I know

00:08:02,670 --> 00:08:07,800
your mission is nearing an end and a

00:08:04,980 --> 00:08:09,750
couple of weeks I just wonder how you

00:08:07,800 --> 00:08:11,610
might characterize your time aboard the

00:08:09,750 --> 00:08:17,279
space station as a sort of life

00:08:11,610 --> 00:08:18,949
experience I think one of the first
adjective that comes to mind is thrilling the second group of words that come to mind is a great deal of work this is a busy place and it needs to be I mean you come up here you need to be ready to work and there's a great deal that we're trying to accomplish and so that means pretty much Sun up to Sun down as it would be on earth anyway though we get 16 of them here that it's continual work almost all day every day and it like I said it needs to be that way because there's so much that we're trying to accomplish so you got to come
up here with an eager energetic attitude

and keep the fire burning because

it's pretty busy like I said and it

should be okay well let me thank both of

you and wish you both the best of luck

as you pursue the rest of your cable

hookups thank you very much super thank

you Mark station this is Houston ACR

that concludes the aviation week and

space technology portion of the event

please stand by for a voice check from

way TV

station this is way TV how do you hear

me we read you loud and clear welcome on
board wait TV read you loud and clear

one flight engineer Terry booths and I

assess commander butch Wilma joining me

right now birch and Terry I'm here in

Huntsville I home of the the Marshall

Space Flight Center and they're probably

at the p.o I see they're probably a

little angry right now that I'm taking

some of your time away from science but

I wanted to ask you I talk to them all

the time about how they work with you so

I wanted to ask you you know on a day to

day basis how often are you guys working

with the people here in Huntsville yeah
goodness on on well first of all home of

272
00:10:09,278 --> 00:10:13,328
the Marshall Space Flight Center and

273
00:10:10,839 --> 00:10:15,910
home of a lot of snow I understand we

274
00:10:13,328 --> 00:10:18,818
are working with them every day and we

275
00:10:15,909 --> 00:10:20,289
are just on most days on the last few

276
00:10:18,818 --> 00:10:21,759
days it's been spacewalks but on most

277
00:10:20,289 --> 00:10:23,349
days we're dealing with them there's

278
00:10:21,759 --> 00:10:24,789
lots of different experiments every day

279
00:10:23,350 --> 00:10:27,040
it's a different type of experiment a

280
00:10:24,789 --> 00:10:28,838
different variety and so one of the best

281
00:10:27,039 --> 00:10:30,099
parts of our time here is a chance to do

282
00:10:28,839 --> 00:10:32,050
science that's the mission that we're

283
00:10:30,100 --> 00:10:34,420
here for and it's a lot of fun doing

284
00:10:32,049 --> 00:10:39,789
such a varied and different amount of

285
00:10:34,419 --> 00:10:41,078
science that we do thanks Terry are you
mentioned the spacewalk that you guys just did I know the p.o I see crew got a little bit of a break yesterday while you guys were out for about six and a half hours you guys are an airlock right now I know both of you are experienced spacewalkers but the question that I have is when that airlock opens in your suit it up what is going through your mind well I’ll say for me this is my first and yesterday was my second spacewalk what's going through my mind is what do I do next where's my tether going to go what handrail do I go to and
you know what are the next steps that
we're gonna do so I'm pretty much just
focused on the task excuses some more
space walking equipment just floated by
but you have to be for every minute it
sells six and half hours out the door
but inside it's a couple extra hours
beforehand an hour afterwards and so
it's literally it's like 12 hours of a
hundred percent concentration on every
every second of what you're doing
yeah I'll say also that the kind of the
motto that Terry and I talked about
before we go out and remind each other
is that there's nothing more important than what you're doing right now if you've done something great put it behind you you got to have more work to do if you've done something bad put it behind you you got more work to do you can't think about what's coming in the future because you're in the vacuum of space and you're attached to this to the station by a little bitty you know kind of a little metal tether and anything could go awry at any moment so you really got to be focused on your task make sure your local tethers are there
you're attaching yourself the station

and keep your mind turning you know when

we fly airplanes both of us are pilots

oh well he's a pilot and I'm a naval

aviator but you always sort of think

about staying in front of the airplane

you never want to get in where you're hanging on to the tail of the airplane

we think the thing thing same thing

about space walking is that if if if you feel like you're getting behind you miss

and you've realized that you didn't put

don't a local tether when you should slow

down because it's vital on them it's a very dangerous environment as you know
and it's vital that we do things that we
do it right and so safety is paramount
and that's that's kind of what we just
like I said try to keep reminding
ourselves up well I've been seeing on on
Twitter you guys have tweeted out
spacewalk selfies and stuff like that so
well remaining focused on the job is
something that you're always doing it
looks like you you take a moment every
now and then to just appreciate you know
I'm doing something that very few people
have ever done before is that right well
that's right you know I'm a photographer
I love taking pictures but I was really shocked on both the first and second spacewalk that we did how little time there was to take pictures on the first-base walk there was there was basically no time I had to grab the camera snap a few quick chures real quick for maybe a minute or less and put it away and I think I did that two or three times almost no time at all and even on the second spacewalk when I had some time where I was just standing still I thought I'd have a few minutes to take pictures but it almost didn't
exist because there's so much work that
you need to do and you just don't want
to waste any time you just want to get
the work done so we try and take them
and we can and hopefully we got a few
good ones but it was surprising to me
because I love taking pictures and I
thought I'd make some time but it's it's
hard it's hard to grab a few minutes
when you're doing a spacewalk which this
question might be more for you I wanted
to ask a little bit about the 3d printer
I know that's that's the project they
got going on at Marshall right now and
they told me that you've kind of adopted

00:14:06,549 --> 00:14:10,689
that you installed it pulled off the

00:14:08,110 --> 00:14:13,089
first pieces and all that so I just want

00:14:10,690 --> 00:14:14,740
to ask what what's the interest in that

00:14:13,089 --> 00:14:19,480
why did you kind of take ownership of

00:14:14,740 --> 00:14:21,039
that well you know you don't you don't

00:14:19,480 --> 00:14:22,600
like just go out say that's mine I'll

00:14:21,039 --> 00:14:24,189
take that fortunately I was very

00:14:22,600 --> 00:14:25,570
fortunate that it would just kind of

00:14:24,190 --> 00:14:28,060
fell in my lap I was here at the time

00:14:25,570 --> 00:14:30,699
kind of alone I was between missions and

00:14:28,059 --> 00:14:31,929
it was time to install it so I sort of

00:14:30,698 --> 00:14:33,219
got to install it and from there I just

00:14:31,929 --> 00:14:35,379
kind of kept meeting scheduled to work

00:14:33,220 --> 00:14:36,910
with it and it was it's very intriguing
I mean you think about the concept of needing apart for the space station you don't have on board and being able literally to print it out in a printer and then go install it oh I need this special tool I don't have that tool on board ok well let's print out that special tool and and make it work and we actually print it out a small wrench as well so I mean it's it's just fascinating technology the possibilities are absolutely endless wearing the baby steps right now of learning how to do this process we're just using plastics
right now in the zero-g environment but the prospects are like I said are just out of this world literally about to where this could take us I'd like to follow up on that where do you guys see this technology going and what do you see the value being for astronauts you know you guys are about a few hours away from a resupply but when we start going farther and farther and farther what do you see the worth of that technology once it starts maturing well yeah it's absolutely valuable for something like that if you could print out tools or
parts that could really save on the mass that you have to launch into space and it could also give you some flexibility if something broke that you didn't anticipate breaking you could print it out and use that part so in the future that this could be really valuable right now there are certain types of plastics that they're using but if that you know maybe eventually we'll be able to do something like metal or with that type of hardness so yeah the for future space exploration there's no resupply missions on Mars so this could
be huge

00:16:04:559 --> 00:16:08:559
yeah I'm excited to see where they're

00:16:06:669 --> 00:16:10:088
going to take it home but we're about

00:16:08:559 --> 00:16:11:948
out of time now so I just wanted to ask

00:16:10:089 --> 00:16:14:649
Terry I know you're about halfway

00:16:11:948 --> 00:16:16:359
through your ex your mission butcher

00:16:14:649 --> 00:16:18:039
you're coming to the end so I wanted to

00:16:16:360 --> 00:16:19:568
ask both of you what he could pick one

00:16:18:039 --> 00:16:21:818
moment that you're going to look back on

00:16:19:568 --> 00:16:28:509
your time in space right now what would

00:16:21:818 --> 00:16:29:649
that be you know I'll say it's hard to

00:16:28:509 --> 00:16:31:629
say that because there's been so many

00:16:29:649 --> 00:16:33:220
moments continued late but I saw sunrise

00:16:31:629 --> 00:16:35:289
yesterday that like I've never seen the

00:16:33:220 --> 00:16:37:300
sunrise before in the visor you just
have this big panorama and when you look out of the station windows it's incredible but there's modules and things in the way but sitting there on the foot restraint it was just you know my body sticking out and watching the sunrise was just incredible it's like you're lookin down on creation and also Butch and I both notice that we saw shades of colors that I've never seen before especially blue so that's definitely going to stick in my mind forever I think for me without question it's it's not the personal...
experience so much for me as it is you

know where we're giving loving caring

beings that's that's what we are and to

be able to share this experience has

been what I'll remember the most you

know the excitement to my wife and my

daughters and my brother and my mom and

dad and many friends and family by some

pictures and some conversations that we

have those are the things that I'll

remember the most without question

certainly I'll take the sights and the

sounds and the pictures all together you

can't have that without that but the the
sharing and with the people that you love and care about is very very special and very very memorable yeah i'm sure it is i'm sure that's quite an experience so we're about out of time i got one last question for you butch so we're here in Alabama in the Tennessee Valley I know you're from Tennessee you have anything you'd like to say to your southern neighbors here in the Rocket City you know we love Alabama at seven football season us tennesseans and we know that Alabamans don't live in God's Country like s Tennesseans do but you're
very close very close cousins and we

00:18:05,259 --> 00:18:11,648
love y'all just the same so absolutely

00:18:07,150 --> 00:18:13,059
we love Alabama I thanks a lot Bush and

00:18:11,648 --> 00:18:15,429
Terry thank you so much for your time

00:18:13,058 --> 00:18:17,710
Bush I hope your safe return home and

00:18:15,430 --> 00:18:21,789
couple of weeks thanks a lot good luck

00:18:17,710 --> 00:18:23,769
with the rest of your trip all right

00:18:21,789 --> 00:18:29,710
thank you and thank you to Alabama and

00:18:23,769 --> 00:18:31,480
all of your weight TV listeners station

00:18:29,710 --> 00:18:36,910
this is Houston ACR that concludes the

00:18:31,480 --> 00:18:44,969
event thank you Thank You Aviation Week

00:18:36,910 --> 00:18:42,250
in space technology in waaay TV station

00:18:40,359 --> 00:18:44,969
we are now resuming operational audio

00:18:42,250 --> 00:18:44,970
communications