hey the heiress is down here yeah okay

get back and do some more things and I

had another rest period so this time I

took one foot out

did a little agility and I looked your

snot down oh there it is up there to be

in the spacesuit outside and to look out

in any direction it was pretty neat it's

humans out there as humans out here it's

humans on the frontier when I opened the

hatch I mean I had the whole universe

apartment it was it was spectacular then

you sort of poke your head out flip

around and you take a look around and
00:01:02,100 --> 00:01:07,379
you know it's really a holy moly kind of

00:01:05,519 --> 00:01:09,509
love that was when I first learned I

00:01:07,379 --> 00:01:11,789
think what the definition where it truly

00:01:09,509 --> 00:01:15,329
is to be alone being in space being in

00:01:11,789 --> 00:01:18,210
Earth orbit floating is truly a magical

00:01:15,328 --> 00:01:20,428
experience it means an exciting day

00:01:18,209 --> 00:01:22,498
it means it's a it's a day that there's

00:01:20,429 --> 00:01:25,049
going to be a lot of work but very

00:01:22,498 --> 00:01:27,298
rewarding work NASA's astronauts and

00:01:25,049 --> 00:01:29,219
their international partners seat up for

00:01:27,299 --> 00:01:29,920
modern spacewalks with training and

00:01:29,218 --> 00:01:32,559
experience

00:01:29,920 --> 00:01:35,170
humans suited up leaving the vehicle and

00:01:32,560 --> 00:01:37,420
going out on spacewalks exploring you
know going beyond and always going into

a situation we've never been to before

fix some things at Space Station to

deploy an experiment or longer-term

I think of space walking on Mars it's

been a lot of time thinking about how

humans are going to explore Mars suited

with some pretty new cool technology

when floating out in the void of space

they are standing on the shoulders of

giants making new discoveries by

building on a prestigious legacy why did

the Russians put Sputnik up

why did the u.s. do that

why did the u.s. do that
we were shooken up by Sputnik and we

00:02:20,969 --> 00:02:29,340
marshaled our resources and put together

00:02:29,340 --> 00:02:34,110
drove us into human spaceflight was fear

00:02:31,348 --> 00:02:36,988
was the fear when Sputnik went overhead

00:02:34,110 --> 00:02:38,549
and in 1957 and people began to realize

00:02:36,989 --> 00:02:40,650
that there was another nation in the

00:02:38,549 --> 00:02:41,700
world it had the capability of putting

00:02:40,650 --> 00:02:42,959
something in the space that could

00:02:41,699 --> 00:02:44,939
actually pass over the United States

00:02:42,959 --> 00:02:46,739
that's not a good way to do a

00:02:44,939 --> 00:02:49,079
sustainable program is through fear

00:02:46,739 --> 00:02:51,299
clearly our motivation was a race it was

00:02:49,079 --> 00:02:53,730
to beat the Soviets and we had to do

00:02:51,299 --> 00:02:55,829
that for international prestige and so
that set us on a sprint to the moon we
will get to the moon within the decade
and we did but it didn't set us up for a
long term exploration program in space
way back when we call it a terrible 60s
when the country was awash in
and in campus at rest civil strife
beginning of a very unpopular war the
Soviets literally owned space at that
point in time you're good Garin back in
in early 1961 made one orbit around the
earth Alan Shepard became the hero that
does country needed America's initial
and successfully crewed space missions
known as Project Mercury were followed

by project Gemini the proving ground

that would lead to the Apollo missions

and the landing on the moon on the

Soviet side cosmonauts and engineers

were doing similar work to extend space

flight duration improve rendezvous

techniques and to develop the capability

to leave the spacecraft in what was
dubbed by NASA as an extra vehicular

activity for Evy a

in order for us to conquer the world via

space we need to learn how to operate

outside of the space because the first
Successful egress from the spacecraft while in orbit was achieved by cosmonaut Alexei Leonov on March 18th 1965 making him the first person to complete an EBA for spacewalk and what I saw you and I saw just half of the world so happen because we were 500 kilometres above the earth chromia Phu look and nobody even up until now nobody’s flying that high you Alexis you know task was to get out and get back in and he had he had basically as best I understand it a February tunnel after he got out of an airlock and he
was literally out there in a vacuum of

00:05:05,699 --> 00:05:14,159
space and and once he got through that

00:05:10,199 --> 00:05:16,379
tunnel his job was to turn around he get

00:05:14,160 --> 00:05:18,090
back in and had a great deal of

00:05:16,379 --> 00:05:20,399
difficulty getting getting back in

00:05:18,089 --> 00:05:21,649
because he had to turn around in that

00:05:20,399 --> 00:05:25,279
tunnel with a

00:05:21,649 --> 00:05:29,899
a pressurized spacesuit at that time

00:05:25,279 --> 00:05:32,448
even for us was like being inhibited by

00:05:29,899 --> 00:05:34,519
a suit of plaster-of-paris I mean it's

00:05:32,449 --> 00:05:37,850
hard to move anything and he literally

00:05:34,519 --> 00:05:41,569
had to deflate his spacesuit at that

00:05:37,850 --> 00:05:45,050
point in time to be able to to reduce

00:05:41,569 --> 00:05:47,180
the size to get back in later that year

00:05:45,050 --> 00:05:49,220
Germany four stood ready to launch from
Cape Canaveral Florida with the primary objective of gathering the results of an extended four-day mission on both crew and spacecraft. Germany's original semi-conservative mission was then expanded to include a dramatic exit from the Gemini spacecraft in what would be America's first spacewalk.

On June 3rd, 1965, the second crewed mission of the Gemini series carried James McDivitt and Edward White into space at 2:46 p.m. Eastern time using a hand-held gas gun. White stepped out of...
his spacecraft leaving crew make

McDivitt be home to witness the vastness

of space alone becoming the first

American astronaut to complete the space

book

another with the gun neon the problem I

have is I've got enough fuel the only

thing I waited our our boy this is the

greatest expense at 15-under

we had ed White's magnificent 20-minute

court walked in space I don't think

he'll ever get any better any better

film it was spaceship 4e I think from

everyone from from from Ed and Jim
McDivitt to everyone on the ground and

Mission Control everybody I was

spectacular he had a little Gunny

control his body could move where he

wanted to go

it set us up as time progressed the

Gemini program continued to refine and

extend GBA procedures as more astronauts

followed with tethered spacewalks in

Earth's orbit well you know the

difficulties that we had in the Gemini

program doing spacewalks because the

state of the art the state of the art

needs to improve but you saw the
difficulties there when you jump out and

00:07:38,658 --> 00:07:43,098
you try to get something done well you

00:07:40,908 --> 00:07:45,889
haven't practiced in the freefall zero-g

00:07:43,098 --> 00:07:47,538
condition and so it's Newton's second

00:07:45,889 --> 00:07:48,978
law you push in something it moves your

00:07:47,538 --> 00:07:52,788
body instead of getting the work done

00:07:48,978 --> 00:07:54,589
and so that whole business you see we

00:07:52,788 --> 00:07:56,889
just evolved don't we grow since

00:07:54,589 --> 00:07:59,779
essentially an open in Germany on

00:07:56,889 --> 00:08:03,129
Americans like Gene Cernan Michael

00:07:59,779 --> 00:08:05,059
Collins Richard Gordon and Buzz Aldrin

00:08:03,129 --> 00:08:08,718
continued the competition with the

00:08:05,060 --> 00:08:10,280
Soviets in the Gemini days when they

00:08:08,718 --> 00:08:13,939
were trying to do the first spacewalks

00:08:10,279 --> 00:08:15,709
from a capsule the first EBA is the
first spacewalks were not very productive the crew members got outside they didn't have anything to hold on to

they kind of flailed around they couldn't do fairly simple tasks and they learned from that that they had to have a better way to train and they started to use water tanks at that time every progressive EBA had different little hang-ups frustration overpowering getting overheated next

came the Apollo program with one of its lofty goals to land Americans on the surface of the Moon and then return them
safely to earth we're going to the moon

okay we're gonna the moon

the Gemini suit you could pretty much

compare it to what this the launch entry

suit was like you know it was a not

custom-made but you could you know the

length and stuff could be configured so

that you did have a certain ability in

the arms and at the knees the difference

being the policies were all custom made

for each crewmember three two one zero

all engine running liftoff we have a

liftoff 32 minutes past the hour liftoff

on Apollo 11
the first steps on the lunar surface were performed by Neil Armstrong and Buzz Aldrin it was July 21st 1969 and the world irrevocably changed with the steps of men very far away from the earth I do remember the first landing on the moon Apollo 11 I remember I was I guess in high school and staying up and watching that and going out and looking at the moon and just marveling about their people up there I think we were all captivated when Neil Armstrong did the ultimate spacewalk which was to actually go out of his vehicle and end
up walking on the surface of another

00:10:20,370 --> 00:10:28,490
another body in our solar system you

00:10:24,120 --> 00:10:32,779
have a mass with the backpack in the

00:10:28,490 --> 00:10:35,480
the body and everything else and and you

00:10:32,779 --> 00:10:39,679
move around and you kind of think that

00:10:35,480 --> 00:10:42,649
you can change direction but that that's

00:10:39,679 --> 00:10:45,919
sort of why at the end of our two-hour

00:10:42,649 --> 00:10:49,449
to an epic re VA I got in front of the

00:10:45,919 --> 00:11:01,789
camera and bounced around with different

00:10:49,450 --> 00:10:54,650
ways of moving

00:10:51,710 --> 00:10:56,780
I was really personally impressed with

00:10:54,649 --> 00:10:59,389
the Apollo EPA's the space of Alex can

00:10:56,779 --> 00:11:01,789
you imagine the first humans to ever

00:10:59,389 --> 00:11:03,889
walk another planetary body to the moon

00:11:01,789 --> 00:11:07,069
so just fantastic and you kind of see
that two-foot bunny hop so we had great space suits we kept the Apollo astronauts alive once we got to learn a Rover setup we were ready to go be lunar explorers if you will and part of the lunar rover had had plastic fenders that that's that when it was folded up we had to unfold and they slid down to cover the wheels but the reason we had a fenders on these things were because the lunar does wasn't one of the biggest problems we encountered on the surface of the Moon it was almost the texture of graphite but graphite the lubricant this
was just the opposite it would get in in

on everything so I was walking doing

some work around the lunar rover and I

put my rock hammer in my pocket with the

handle sticking out I've caught it under

one of those extensions as a fender and

boom blow it off if the dust would have

come right over the top and immersed us

in all this dust that we had to figure

out a way we took four maps for lunar

gеology map and taped them together and

took a couple light clamps and clamped

them and it didn't jump

and and what are we taping with duct
tape we went from there into the Skylab

program and we went to the a 7lb at that time so Apollo you know so on the

surface with a 7l a spacesuit and we do have a 6 of a gravity and we do have two life-support system on the back which is taking care of all our physiology the

cooling to oxygen removing the carbon dioxide and all the rest of that in a Skylab program we were on an umbilical

the umbilical provided all of the physiology if you will the umbilical

between the space Walker and the Skylab

space station provided all the life
support when we went into the shuttle

00:13:02,240 --> 00:13:07,159
program moving back to riding a backpack

00:13:04,779 --> 00:13:13,939
but the big difference between the

00:13:07,159 --> 00:13:16,279
shuttle and an Apollo was that we did we

00:13:13,940 --> 00:13:18,740
integrated the backpack with the su

00:13:16,279 --> 00:13:20,629
itself so Apollo was you where to

00:13:18,740 --> 00:13:23,210
backpack there and you bring the hoses

00:13:20,629 --> 00:13:26,120
around the connected in the shuttle

00:13:23,210 --> 00:13:28,220
program we integrated the heart upper

00:13:26,120 --> 00:13:31,159
torso and the life-support system

00:13:28,220 --> 00:13:33,980
but importantly to us then was we did

00:13:31,159 --> 00:13:37,819
away with the zipper that is zipper

00:13:33,980 --> 00:13:42,139
worked and I have taken a zipper to a

00:13:37,820 --> 00:13:44,960
vacuum many times the zipper starts here

00:13:42,139 --> 00:13:49,159
and it rolls around and it rolls up the
back and the zipper is maybe three feet

long and it is a zipper and a zipper is

the only thing between you and eternity

Space Wing is actually saved some of our

programs so we can look at Skylab which

sky love the habitat was getting very

very hot and the astronauts had to go

outside in their spacesuits perform the

extra vehicle activity and they

literally save Skylab without a VA

Skylab would have not been habitable

they had to deploy the solar array they

had to deploy the thermal canopy over

the damaged area so EBA saved that that
mission completely another great example

from the gamma-ray Observatory mission

Jerry Ross and J apt went out and

literally got an antenna deployed and it

saved you a major observatory so really

important interaction when humans are

suited and kind of saving very large

missions my first job in the astronaut

office after my initial training program

was completed was to start working on

EBS or spacewalks on the equipment in

fact we worked with the early crews to

design what their spacewalks would be

like STS 5 was first planned spacewalk
and they had equipment malfunction was

prohibited from going outside and then

STS 6 was the first one we actually

conducted some spacewalks so I worked with those crews helping them to figure out what tools we had available to them

if they could test out and operate in the vacuum of space out in the payload

Bay of the orbiter and then we progressed from there the suit was not a brand new suit anymore I had run it through all the on the floor

it's the 1g test I'd run it through a vacuum testing I had run it through a
certification where the number of cycles

00:15:34,419 --> 00:15:39,629
you put on every other joints I've been

00:15:37,419 --> 00:15:42,338
in the water with it so it was a friend

00:15:39,629 --> 00:15:44,320
from that then we started to develop

00:15:42,339 --> 00:15:46,260
things like the men maneuvering in it

00:15:44,320 --> 00:15:48,430
the little rocket backpack that we

00:15:46,259 --> 00:15:51,700
demonstrated on several flights and used

00:15:48,429 --> 00:15:53,708
in some cases in dramatic fashion doing

00:15:51,700 --> 00:15:56,680
the first fully untethered spacewalk

00:15:53,708 --> 00:15:59,769
Bruce McCandless zoomed about a manned

00:15:56,679 --> 00:16:01,569
maneuvering unit this equipment test

00:15:59,769 --> 00:16:03,578
would lead to the retrieval of stranded

00:16:01,570 --> 00:16:05,180
satellites on subsequent missions years

00:16:03,578 --> 00:16:07,479
later and I

00:16:05,179 --> 00:16:11,239
we really jealous of Bruce McCandless
when he had a backpack and went out

a ways without a tether maneuvered

around over the following years extra

vehicular activity became one of the

space travelers most exciting and

necessary tools in his or her tool belt

it was July 17th 1984 as cosmonaut

Svetlana savitz kiyah broke the

proverbial glass ceiling and became the

first woman to walk in space Kathryn

Sullivan followed shortly after on

October 11th becoming the first female

American astronaut to perform a

spacewalk this is the first chance I had
to stick my head out the hatch on our

EBA on day 7 as time progressed so did

the need for advanced technology and

utilities complicated missions and space

program saving maneuvers are the essence

of NASA's extra vehicular activity there

was one time when I was on the end of

mechanical arm it was on the Hubble

mission and I was being moved from one

place to another and I really have no

sensation of movement when you're on

that arm it's just so smooth there's

nothing there's no drag of the water

pulling you back and so you don't really
know you're moving and I was just I was

working on the tools I was putting the

sockets on for the next whatever tasks I

had to do next and the guys stopped and

they said you have to look at this you

just have to stop and look and so I

stopped and looked and we were over the

Gulf of Mexico gets the entire of North

America and we can see aurora up over

Canada and it was just an amazing view

we started to develop little power tools

we developed more wrenches and other

kinds of tools that we could use for

other types of failures that we
identified in the payload bay door

386
00:17:48,950 --> 00:17:54,890
mechanisms to to remove debris or to

387
00:17:52,849 --> 00:17:56,659
disconnect things should they should

388
00:17:54,890 --> 00:17:58,759
they not function properly from the

389
00:17:56,660 --> 00:18:01,190
Apollo programs deep-space missions

390
00:17:58,759 --> 00:18:03,650
around and to the moon to the u.s.

391
00:18:01,190 --> 00:18:04,830
Skylab shuttle and International Space

392
00:18:03,650 --> 00:18:07,980
Station program

393
00:18:04,829 --> 00:18:10,949
spacewalkers have suited up on board the

394
00:18:07,980 --> 00:18:12,539
spacecraft you get the today - spacewalk

395
00:18:10,950 --> 00:18:14,100
crewmembers who go out work

396
00:18:12,539 --> 00:18:15,869
cooperatively together they become

397
00:18:14,099 --> 00:18:18,059
brother and sister brother and brother

398
00:18:15,869 --> 00:18:21,479
sister and sister they learn how to work

399
00:18:18,059 --> 00:18:23,730
as a very coherent team they actually
understand each other's moves they know

where they're supposed to be you've got

then nowadays robotic operator who's

generally moving one or at least one of

the crew members around on a robotic arm

you've got the IV crew member the inter

vehicle er crew member who is for all

intents and purposes the choreographer

has the whole mission kind of committed

to memory knows when somebody's out of

position knows when somebody's about to

get too far away for they can be safely

tethered back on earth in the Mission

Control Center you have the primary
00:18:51,990 --> 00:18:58,559
person on console that is the the Eevee

00:18:54,710 --> 00:19:01,950
or the extra vehicular controller in the

00:18:58,559 --> 00:19:03,839
backroom they probably have anywhere

00:19:01,950 --> 00:19:06,120
from 25 to a hundred people who are

00:19:03,839 --> 00:19:08,639
looking at data from each of the

00:19:06,119 --> 00:19:10,409
spacewalking astronauts they're looking

00:19:08,640 --> 00:19:12,690
at data from the spacewalk that's

00:19:10,410 --> 00:19:15,779
actually going on and then somewhere in

00:19:12,690 --> 00:19:18,750
the world like at a place that built the

00:19:15,779 --> 00:19:20,220
spacesuit or somebody that designed the

00:19:18,750 --> 00:19:22,140
procedure that's being done whether it's

00:19:20,220 --> 00:19:24,870
in Denver Colorado or Connecticut

00:19:22,140 --> 00:19:26,430
they're also looking on and and they

00:19:24,869 --> 00:19:28,289
have their own data that they're
evaluating and getting all that back

into Mission Control in Houston telling

the flight control team okay we see this

developing or we see this happening you

need to let the crew know so probably

thousands of people supporting the

development of the types of spacewalks

that we're going to do and and then

hundreds actually involved in the

spacewalk on that particular day it was

part of our training to make sure that

you know even though you might be

nervous try not to show them that you're

nervous everything had to be laid out
perfectly you know I mean from the start

00:19:59,400 --> 00:20:04,650
you know you had your checklist it was

00:20:01,950 --> 00:20:06,330
all laid out properly you know which

00:20:04,650 --> 00:20:09,450
pocket every pin went

00:20:06,329 --> 00:20:12,349
and you know even down to where the

00:20:09,450 --> 00:20:15,058
pocket they wonder their sandwich put in

00:20:12,349 --> 00:20:19,139
it has been the astronauts mantra to

00:20:15,058 --> 00:20:23,700
drain test and succeed one of the things

00:20:19,140 --> 00:20:27,028
that astronauts learn to do to to look

00:20:23,700 --> 00:20:31,558
at a situation and don't panic about

00:20:27,028 --> 00:20:35,250
anything you'll make it worse but think

00:20:31,558 --> 00:20:36,329
carefully did you do something wrong and

00:20:35,250 --> 00:20:37,710
then fix it

00:20:36,329 --> 00:20:39,269
well the astronaut prayer which is

00:20:37,710 --> 00:20:41,038
please God don't let me screw this up
that's the first thing I think the

biggest fear that that I had and maybe

many astronauts as well is not that I

was going to get hurt it's that I was

going to mess up because everybody's

watching he has such a limited time out

there to get done what needs to be done

and you really really don't want to make

a mistake it was cold so that was a

little surprised but we should have

anticipated cold but it turns out at

that point we had only done hot space

walk until STS six they had all been

warned
the STS-125 crew which was the final
Hubble servicing mission that almost
none of us thought they would be able to
successfully complete five back to back
to back to back TVA's and do all
that they were supposed to do and they
not only completed them in spite of
obstacles that almost pump at every turn
on almost every single TVA but they did
them superbly and left Hubble in
incredible shape and I think they did
a tremendous service to planetary
science astrophysics and in just the
field of spacewalks in terms of showing
people that if you really work hard at

it and you plan it and you execute the

way you plan there's nothing we can't do

when you're doing a spacewalk on-orbit

you're in your own spaceship it's your

spacesuit but it keeps you from the

vacuum outside and your crewmates inside

the space shuttle I had one moment on

the Hubble Space Telescope mission where

a true voice told my space walking

partner was on the other side of the

telescope and I was holding on to a

handrail looking up at the earth go by

behind the Hubble and it was a truly

behind the Hubble and it was a truly
remarkable moment but I did realize you

know how far away we were from the

Earth's atmosphere from our homes from

our companions inside the space shuttle

and I wouldn't say that I felt a sense

of loneliness but a sense of awe you

know that we're doing these kind of

things that were able to to fix the

Hubble to orbit the Earth through

spacewalks complex problems have been

solved in extreme ways such as fixing

the Hubble Space Telescope's blurry

vision turning a possible billion-dollar

piece of space junk into one of the most

revered scientific instruments of human
history visions like Hubble tested the mettle of space walkers an elite breed among an already out-of-this-world group of adventurers stay that on Hubble itself it's a very fine motor skill to do me doing very close in a lot of hands work so it's almost like doing surgery on your Hubble in a suit versus being a longshoreman when you're on Space Station or you're just hanging moving big blivet surrounding you're changing stuff out and that tradition continued with the role of EBA's which built the tremendously successful International
Space Station it's been 50 years since NASA's first DDA when and white went out on Gemini 4 we've come a long way since that first one building the International Space Station it was very very EDA intensive and when we were planning for it everybody talked about the wall of EDA we're never going to be able to accomplish all this and when you look back on what we accomplished it was pretty darn amazing so on my first flight we were right in the middle of the construction of the space station so of course every shuttle
flight that went up was full of spacewalks and just putting pieces together every single EBA was an important and necessary component of the assembly sequence so I think we all feel that you know we had a hand in laying the Keystone or however you want to describe it to see the ISS now and the spacewalks that they do to get doing repairs and it's just incredible station is more than 14 years old built by space walkers and continues to be maintained and upgraded through spacewalks in the most advanced space
suits the world has ever seen

557
00:24:29,799 --> 00:24:34,299
spacewalks are not they look like

558
00:24:32,109 --> 00:24:35,889
they're incredible fun and they probably

559
00:24:34,299 --> 00:24:37,659
are for the crew member when you really

560
00:24:35,890 --> 00:24:38,800
get down to it but we must never forget

561
00:24:37,660 --> 00:24:42,430
how dangerous they are

562
00:24:38,799 --> 00:24:46,869
I felt something that was not unexpected

563
00:24:42,430 --> 00:24:49,980
I felt cold water on the back of my hand

564
00:24:46,869 --> 00:24:55,979
and that surprised me

565
00:24:49,980 --> 00:24:57,720
I contacted the ground which is the

566
00:24:55,980 --> 00:24:59,849
first thing you would do when when

567
00:24:57,720 --> 00:25:03,029
something that you're not expected comes

568
00:24:59,849 --> 00:25:05,009
up so I asked Houston for for advice you

569
00:25:03,029 --> 00:25:06,839
know I said I feel water in my helmet

570
00:25:05,009 --> 00:25:10,079
but what it feels like a lot of water
the ground doesn't have a lot of

information on the suit they can monitor

some things they have telemetry about my

status my battle status and they know

how the suit is performing but a lot of

things we couldn't tell at that point is

the water increasing in my helmet in the

back of my helmet I I couldn't tell the

ground crew until they were trying to

come up with what could be the possible

problem in this solution finally came

the decision from from the ground to

detect the safest option which is we are

we're going to terminate this in da
first and Luca just for you guys

based on what we heard with Lucas saying

that water is in his eyes now and it

seems to be increasing we think we're in

a terminate DV a case for Evie to and so

when they told me you can do that you're

going to travel back to the airlock

increase is going to clean up and and

then follow you that's what we did and I

started translating back to the airlock

I had to go upside down and

translating with my head towards the

ground and it always happens a lot of

things up and at the same time the Sun
went down and at that point you go from 600
you go to zero darkness no BC BT and 601
cold and at the same time the water 602
sloshed around the helmet and any cover 603
my eyes and and my nose and my ears so 604
all in once I was isolated both being 605
outside in my spacesuit 606
but it was also sensory isolated I 607
couldn't see and I I couldn't hear and 608
like didn't quite know where I was how 609
to find my way back to the to the 610
airlock at that point it it was obvious 611
to me that I needed to to go back to the 612
airlock by myself and do it as fast as I 613
could because I could still breathe

00:26:58,920 --> 00:27:03,420
through my mouth but I didn't know how

00:27:01,170 --> 00:27:04,800
much water was in the helmet and I

00:27:03,420 --> 00:27:07,590
didn't know if there would be more

00:27:04,799 --> 00:27:09,750
watering the helmet thankfully we spent

00:27:07,589 --> 00:27:12,599
hundreds of hours underwater and the

00:27:09,750 --> 00:27:14,309
neutral buoyancy lab learning the

00:27:12,599 --> 00:27:15,990
configuration of the space station

00:27:14,309 --> 00:27:18,569
learning how to use our spaceship

00:27:15,990 --> 00:27:20,670
learning how to navigate and so using

00:27:18,569 --> 00:27:23,039
using that experience and using my

00:27:20,670 --> 00:27:25,830
knowledge of the suit and everything I

00:27:23,039 --> 00:27:29,879
had with me I was able to to find my way

00:27:25,829 --> 00:27:32,309
in the dark in the blind back to the

00:27:29,880 --> 00:27:34,020
airlock once I found the airlock door
everything became a little better

because once I open a term of cover the airlock is illuminated and that made a huge difference because now I knew I knew where I was and I knew I could get inside by myself in the end of it was that at that point I had no communication whatsoever I couldn't hear my ears were filled with water but I was looking up and as soon as they opened the hatch between the space station in the airlock I saw my crewmates and the look on their faces
they were so worried and and so relieved

at the same time and they pulled me out

and as soon as the coudé the deflated

suit and I locked the helmet

and that look on their faces and see

their faces was a very happy moment for

me I got so relieved and so happy that

they were all wrong today the

International Space Station is being

used as a proving ground to conduct the

research and test the technologies that

will take humans beyond low Earth orbit

and deeper into the solar system than

ever before to the area around the moon
to an asteroid and on to Mars we will

pioneer space not just to visit but to

stay we're going to migrate out over the

next five to ten years into

repositioning humanity in lunar orbit so

we will spend most of our time orbiting

the moon and doing more technology

development but learning basically how

we operate in a in a low gravity or no

gravity environment because that's the

way it will be when we go to Mars Mars

is gravity is less than than Earth

operating there will be significantly

different than operating here in

low-earth orbit when we do the asteroid

00:29:19,859 --> 00:29:24,869 redirect mission and we we reposition an

00:29:22,349 --> 00:29:27,899 asteroid into a stable retrograde orbit

00:29:24,869 --> 00:29:31,319 around the moon then the the dominant

00:29:27,900 --> 00:29:33,330 gravity for that group of explorers if

00:29:31,319 --> 00:29:35,039 you will is going to be the asteroid

00:29:33,329 --> 00:29:37,769 itself and that's going to be a very

00:29:35,039 --> 00:29:41,399 very very low gravity field if any at

00:29:37,769 --> 00:29:44,910 all so we've got a lot of development of

00:29:41,400 --> 00:29:46,880 tactics techniques and procedures never

00:29:44,910 --> 00:29:50,220 know when you build a piece of hardware

00:29:46,880 --> 00:29:52,170 the guys back in the 70s and gals that

00:29:50,220 --> 00:29:54,690 had built and designed and tested the

00:29:52,170 --> 00:29:56,430 originally amuse which we're still

00:29:54,690 --> 00:29:57,720 flying today by the way the life-support
systems are still the original life

support systems that we had 37 years ago

you never know where that hardware is

going to end up to seat a suit you know

to see it go on over the decades and

into we never planned on

hundreds of spacewalks and a key thing

there is in structural integrity is you

identify weakness before fair from here

NASA engineers technicians and

astronauts will figure out new ways to

overcome the next set of challenges we

decided to orbit the Earth a lot instead

of going deeper into space and now I
think it's time for us to take that step

beyond orbiting the Earth and moving on

we don't have the same momentum we had

when we had an enemy that we were afraid

of so we are not in competition as much

as I think we need to be in cooperation

with other nations in order to move all

of us forward and out into space Mars is

really extreme which is the great part

about it is challenging so when we get

to Mars you're gonna need to be provided

your life support and pressure with a

spacesuit but it'll have to be really

something new in terms of to
be very lightweight be very mobile we
don't really have a locomotion suit we
have space suits for the vacuum of
microgravity
so you're weightless which is great but
that's a very different environment now
when we get to Mars we have gravity
three A's gravity so we're bipedal again
so we're going to be walking bending or
going there to search for life looking
for fossils and digging things up so you
really are an explorer so it is akin to
Lewis and Clark expedition and no
exploring and moving out into the West
it's really the next frontier for anyone

00:31:35,039 --> 00:31:41,309
who goes on another evie a stroll back

00:31:39,119 --> 00:31:43,919
on a moon or on Mars and will do both

00:31:41,309 --> 00:31:46,980
one day I know that'll happen

00:31:43,920 --> 00:31:48,840
take duct tape we are currently further

00:31:46,980 --> 00:31:52,549
along than ever before in human history

00:31:48,839 --> 00:31:52,549
on our journey to Mars

00:31:56,539 --> 00:32:00,750
American engineers and scientists around

00:31:58,980 --> 00:32:02,759
the country are working hard to develop

00:32:00,750 --> 00:32:05,250
the technologies including new

00:32:02,759 --> 00:32:08,390
spacesuits that astronauts will use to

00:32:05,250 --> 00:32:12,680
one day live and work on the Red Planet

00:32:08,390 --> 00:32:12,680
next stop Mars

00:32:28,950 --> 00:32:31,009
you