1. 00:00:08,650 --> 00:00:12,210
   why did you want to be in

2. 00:00:12,480 --> 00:00:18,640
   well I told you I used to draw these

3. 00:00:15,130 --> 00:00:20,230
   little Rockets when I was a kid and I

4. 00:00:18,640 --> 00:00:22,390
   followed through as many of the moon

5. 00:00:20,230 --> 00:00:24,730
   missions I remember a couple more than

6. 00:00:22,390 --> 00:00:27,849
   others and did that make me want to be

7. 00:00:24,730 --> 00:00:29,920
   an astronaut I don't know I was I was

8. 00:00:27,849 --> 00:00:32,409
   enthralled by it at the time I think it

9. 00:00:29,920 --> 00:00:34,719
   it made me interested in space

10. 00:00:32,409 --> 00:00:38,529
    it made me want to understand things

11. 00:00:34,719 --> 00:00:40,030
    that are larger than life and I think

12. 00:00:38,530 --> 00:00:41,829
    that's why I wanted to go fly for the

13. 00:00:40,030 --> 00:00:45,340
    Navy and Landa playing on an aircraft

14. 00:00:41,829 --> 00:00:46,839
    carrier I had when I was in college some
co-op assignments in a nuclear power plant. I just had this desire to understand things that just seemed too big to be understandable. Maybe that's where my desire to be an astronaut came from. I want to learn more about the whole Chris Ferguson story. Start by telling me about your hometown and what it was like for you growing up in Philadelphia. Sure, as you said Philadelphia is my hometown. I was fortunate enough to be born and raised and got to spend my early years in Philadelphia. I know all of my grade school in high school.
school years in one place which is which
was really nice we had a close-knit community in Northeast Philadelphia
still keep in touch with a lot of a lot of the neighbors and in friends from
high school went to school not too far away in downtown Philadelphia at Drexel
and very fond of those days it was a big Philly sports fan you know loved the
Phillies loved the Eagles loved the Flyers go flyers and and then we you
know when when Navy time came we moved out and really I have a lot of family
back there and we missed the area but
haven't been that back there and you

00:01:51,579 --> 00:01:55,659
know about 27 years right now but a lot

00:01:53,829 --> 00:01:59,049
of fond memories you got a chance to see

00:01:55,659 --> 00:02:01,868
it from space yeah I did my last flight

00:01:59,049 --> 00:02:03,459
we tried to it was he was during the

00:02:01,868 --> 00:02:04,868
wintertime and winter winter is always

00:02:03,459 --> 00:02:08,259
cloudy but there was a particularly

00:02:04,868 --> 00:02:09,610
clear day and I noticed just prior to

00:02:08,258 --> 00:02:10,568
landing we were gonna make a pass that

00:02:09,610 --> 00:02:13,420
was going to take us close to

00:02:10,568 --> 00:02:14,949
Philadelphia and you don't spend a lot

00:02:13,419 --> 00:02:16,179
of time you wish you spent more time

00:02:14,949 --> 00:02:17,439
looking out the window while you're up

00:02:16,180 --> 00:02:19,239
there but you just unfortunately don't

00:02:17,439 --> 00:02:21,188
have the time to spend looking out the
window but this wasn't it an hour that

we had

and I remember coming up on the Great

Lakes and making out the Great Lakes and

then thinking well we're gonna we're

getting closer and but little did I know

how close we were in vogue because I

was able to look out while we were over

the Great Lakes and I saw the Chesapeake

Bay the Virginia coast

I saw Manhattan Island Long Island and

eventually honed my way and this is over

the Great Lakes I was able to pick all

this out and eventually found what I
thought was the Philadelphia area and we ended up passing about 100 miles to the north but it was oblique enough that you could look at and you can. I did find Philadelphia from space you can recognize it even at a hundred miles. you know what sticks out the rivers stick out the airports you can find you so I define you know exactly as the International Airport there's Northeast Philadelphia Airport use the airports they help bridge is help to how do you feel like the the people and the
place help make you the person that you are and I owe a lot to my parents of course you know my parents extraordinarily supportive unfortunately lost my father at a very young age I was 20 when he passed away and a lot of folks have said to me he said what would your father think if he could see you today and I Anna he would have just he would have loved every moment of this I'm certain of it my mom Mary Ann she was an incredible source of support they they worked very hard to put me through a parochial
school in the Philadelphia area which

00:03:49,000 --> 00:03:54,849
you know it's private school and it's

00:03:51,459 --> 00:03:56,590
it's not trivial I mean it's even more

00:03:54,849 --> 00:03:59,019
difficult I think today to maintain that

00:03:56,590 --> 00:04:02,109
kind of tuition going through elementary

00:03:59,019 --> 00:04:03,849
in high school but I owe an enormous

00:04:02,109 --> 00:04:05,500
amount to my parents and of course I

00:04:04,029 --> 00:04:07,449
said I went to a parochial school hard

00:04:05,500 --> 00:04:10,568
for sure Bryan high school st. Martha

00:04:07,449 --> 00:04:13,209
grade school up there and still to this

00:04:10,568 --> 00:04:14,949
day keep in touch with with several of

00:04:13,209 --> 00:04:17,709
the teachers and have had a chance to

00:04:14,949 --> 00:04:19,599
thank them personally for the

00:04:17,709 --> 00:04:21,038
inspiration that they gave me although

00:04:19,600 --> 00:04:23,470
they didn't know it and I didn't know it
at the time how they inspired me to continue my path where I enjoyed math I enjoy science biology physics my favorite subjects going through school take me on the rest of that trip after high school and going on to college and in your professional career in the Navy how did you what did you do remember in college I had a big decision to make it was I knew I was going into the Navy and I didn't know whether I wanted to fly or if I wanted to become a nuclear power officer and a nuclear
reactor officer on an aircraft carrier

or a submarine and it was one of our

summer we called them cruises as a

midshipman where they exposed you to

these various facets of Navy life and it

was after one of those they say well I

think I’d like to fly so that cemented

it right there you know about that time

movie like the right stuff came out and

I always had a fascination about naval

aviation and then I learned that a lot

of the early astronauts were Navy pilots

they all went to Navy test pilot school

so I began to never with the intent of
ending up as an astronaut I began to put myself in these positions so I could go to test pilot school I could get an advanced degree at the Navy's postgraduate school just to put myself close enough that if the opportunity arose I could apply to be an astronaut and everything worked out really well military service is challenging on the family but my career those arduous deployments were spaced out just enough that we could recover and ended up doing a 26-year career of course selected in NASA
after about 14 years of it so it

just worked out I was very fortuitous

that things worked out the way they did

for me

you didn't go to be a navy flier so you

could become an astronaut no standard no

absolutely not I wanted to land it I

wanted to land a jet at an aircraft

carrier I wanted to see if I could do

that and

that worked out really well spend some

time met some fantastic people in two

different squadrons VF 11 VF 2 11 in the

Navy and just enjoy the living daylights

out of that enjoy the engineering aspect
enjoy being a test pilot the whole

science side of flying worked in with

weapons separation you know there's a

whole science to making sure that a

missile or a bomb separates correctly

from an airplane because the aerodynamic

forces are very high that could cause to

push it back up and you don't want

anything like that just love their

dynamic side of things but didn't do it

to be an astronaut it was just something

that fell out the Navy career that you

had has its share of dangers you ended

up in a job as an astronaut that has its
own unique set of dangers - Chris what

is it that you think that we're getting

you're learning as a result of client

people in space that makes it worth

doing this yeah well I think we're

explorers by Nature

you know you look at the early Magellan

Columbus you know we just these people

have this inherent desire to understand

the unknown so they they get in a ship

and they and they go and they're just

gonna see what they find we have done

fantastic things in space I mean we have

brought we brought the globe together in
space in the form of the International

Space Station where we formerly had these conglomerates in Russia and Europe

Japan United States that had their independent space programs but we've managed to bring them all together so we speak a common language the interfaces all work together and we all we all did that because we agreed to cooperate internationally on the space station you know as far as what ultimately will this by this I'd like to think number one it inspires a generation of young folks I mean I was inspired by what we did in
Apollo I can hope that young folks today see what's happening on the space station the medical research that we're doing the the research that we're doing on the environment our ability to clean our own air to take urine and recycle it and reuse it these closed system things are very consistent with some of the environmental issues that we're going to face on the planet Earth over the next hundred years or so and we're pioneering all these in space right now we're learning how to support humans in in very unforgiving environments so I mean I could continue
but the list goes on but you know we
just have we have a home up there and
we're destined to be up there and we're
destined to go beyond low-earth orbit
perhaps set up a colony on the moon and
go on to Mars
you're one of four crew members
final flight of space shuttle Atlantis
the Chris give me a summary of the work
that's planned for sts-135 and what your
jobs gonna be sure of course 135 wasn't
really a planned mission until very
recently it was supposed to be a rescue
mission since the orbiter was ready they
were stacking and processing it just

like it was a regular flight they said

well you know if we put an mplm in the

back we loaded up with cargo we can

probably get an extra year's worth of

provisions up to the space station so I

think that's how the evolution of

sts-135 came about as far as what we're

doing big picture we're delivering about

17,000 pounds of cargo in an mplm we're

also going to deliver a robotics

refueling knowledge module which which

is a fisher-price play toy if you will

for the special purpose
dexterous manipulator and we'll be bringing home a pump module that failed on the space station about six months ago so that's that's big picture we're also going to bring back a lot of cargo a lot of spare things that have been in the space station in an effort to clean it out a little bit there's a lot of Space Shuttle related items that we keep up there permanently from flight to flight after this flights over there'll be no reason to have them up there so we'll bring a lot of those home as well so largely it's a cargo mission it's an
effort to posture the space station for

00:10:53,080 --> 00:10:58,660
about a year put in a good position

00:10:55,419 --> 00:11:00,669
until we can get our commercial cargo

00:10:58,659 --> 00:11:03,039
resupply system up and running so you're

00:11:00,669 --> 00:11:04,259
making the most of the shuttles capacity

00:11:03,039 --> 00:11:07,719
both up and down

00:11:04,259 --> 00:11:09,669
absolutely. i the final numbers are not

00:11:07,720 --> 00:11:11,350
in but I'm under the understanding this

00:11:09,669 --> 00:11:13,419
will be one of the heaviest empty LMS

00:11:11,350 --> 00:11:14,920
that have ever gone up and it will be

00:11:13,419 --> 00:11:17,649
the heaviest mplm and that will have

00:11:14,919 --> 00:11:19,449
come back now there are only four people

00:11:17,649 --> 00:11:21,189
on the crew for this mission what that's

00:11:19,450 --> 00:11:23,350
unusual what's the difference that's

00:11:21,190 --> 00:11:26,860
very unusual i think the last time we've
done this was back in the mid 80s STS 6

I believe we had 4 crew members now

that's half the answer we've we've had

shuttles that have been crewed by four

people they were space station rotation

missions so in addition to the four

shuttle crew members we also had three

space station crew members so there were

seven bodies onboard the shuttle but

three of them were destined for for

rotation on the space

so you really couldn't consider them a

full-time shuttle crew but we'll only

have four bodies there all four would be
on the flight deck so this will be the first time that the mid-deck will actually be empty for launch and at least devoid of astronauts we're gonna fill the the the seats with bags if you will just take more cargo up there but this is very unusual and it brings a lot of interesting challenges associated with it a lot of emergency procedures that we practice for example have some actions on the mid-deck and we've had to work around those a little bit with with a limited number of crew members why just for this
time well it has to do with the fact

that there is no rescue shuttle for this

flight of course since Columbia we've

we've had a very engaging program of

inspection and the capability to rescue

a crew in the event that the shuttle

curred some launch damage like

Columbia did back in 2003 since there is

no backup shuttle for this we have to

rely on an alternate means to get the to

get the astronauts back and they will be

through the normal rotation of Soyuz

vehicles that that come up to deliver

the new crew members now we launched

00:12:31,190 --> 00:12:33,049
316
00:12:28,549 --> 00:12:33,049
flight of course since Columbia we've

00:12:31,190 --> 00:12:36,410
316
00:12:33,049 --> 00:12:39,169
we've had a very engaging program of

00:12:36,409 --> 00:12:41,209
318
00:12:33,049 --> 00:12:39,169
we've had a very engaging program of

00:12:36,409 --> 00:12:41,209
318
00:12:33,049 --> 00:12:39,169
we've had a very engaging program of

00:12:36,409 --> 00:12:41,209
318
00:12:33,049 --> 00:12:39,169
we've had a very engaging program of

00:12:36,409 --> 00:12:41,209
318
00:12:33,049 --> 00:12:39,169
we've had a very engaging program of

00:12:36,409 --> 00:12:41,209

about four soyuz's per year with the

alternating crews of three on them so

there's always six people aboard the

space station in the event for some

reason Atlantis
does incur some type of damage that

would prevent it from being a successful

reentry vehicle we'll stay aboard the

station and we'll wait for that rotation

of so uses to to come up instead of

coming up with three people however

they'll come up with two which will

leave an empty space for one of the the

shuttle crew members to get back it's a

it's a well thought out but lengthy
343
00:13:38,750 --> 00:13:45,799
rescue process the first crew member

344
00:13:42,019 --> 00:13:47,120
would return about 80 days after the

345
00:13:45,799 --> 00:13:48,979
space station the space shuttle was

346
00:13:47,120 --> 00:13:51,230
stranded and the last crew member would

347
00:13:48,980 --> 00:13:52,909
be about 340 days so close to a year on

348
00:13:51,230 --> 00:13:55,700
orbit but it's a very low likelihood

349
00:13:52,909 --> 00:13:58,969
scenario if you believe the statistician

350
00:13:55,700 --> 00:14:01,009
is about 1 and 560 is what they

351
00:13:58,970 --> 00:14:01,190
calculate the need for shuttle rescue

352
00:14:01,009 --> 00:14:04,370
would

353
00:14:01,190 --> 00:14:05,960
they so like then one at a time you and

354
00:14:04,370 --> 00:14:08,389
your crew members would take advantage

355
00:14:05,960 --> 00:14:11,570
of that empty seat on the Soyuz to come

356
00:14:08,389 --> 00:14:13,879
down how do you feel about flying on a
possibility of flying on a Soyuz vehicle.

and of spending a few extra months in

space well I think you know we take

these things in stride I mean we've all

accepted this I think it would in an

interesting sort of way it would be a an

easy way to get to space station

increment without the year and a half of

or the two and a half years of training

not of course that we would want

anything like that because there are

people that have trained for years for

those positions and we certainly

wouldn't want to take them from them but
as far as the preparations that have gone on to get us ready the NESC the NASA engineering safety committee has put together an excellent plan that showed off the space missions Directorate that we are ready to do this we have we have extra Russian language we've received extra space station systems training we've been fitted for Sokol suits and I lks the the seat that we return in on the Soyuz so we this has been well thought out we're very well prepared you know we wouldn't necessarily be considered full
time Russian Soyuz crew members but we could fulfill a role as a rescue II with very little difficulty so it's a well thought-out plan you've been asking people about what it's like to come home and I saw you I have and it floats around our office a little bit what it's like to come back I think it would be an interesting experience of course we'd much rather come back on our space shuttle but we're prepared to come back on the Soyuz if we have to each of the members of your crew has been to the space station at least once before and Sandy Magnus has completed a
long-duration mission there how's all

that experience helped you guys in

getting ready for this flight mm-hmm

tell you Sandy's experience onboard has

just proven to be invaluable of course

she went up with with me and our crew

when sts-126 so I'm very familiar with

sandy

and she really brings a just a wide

array of skills with you know based upon

her time on board so if sandy says

something about the space station we

generally listen to it of course every

other crew member has also been the
station now the configuration has changed a little bit over the years so I think we're all eagerly anticipating seeing what the space station looks like today but we have been able to wave a little bit of our training by virtue of some of the experience that we've had and that's also been kind of a crucial component of having this crew of four is that we do since we do have some experience on the station already we've been able to absorb a lot of that added training and actually cancel some of it because we've been up there before.
and we are familiar what are you looking forward to about that's different on the station to see this time around I want the million-dollar view out of that cupola that's what I want to see when I was up there last node3 wasn't there the cupola was not there the PMM was not there so the station is expanded in a lot of in a lot of great ways but of course that cupola is a view to behold and I'm looking forward to experiencing that as you said this flight carries well a shuttle full of supplies for the International Space Station give us a
sense of the kinds of different things

00:17:40,319 --> 00:17:45,240
that you and your crewmates are bringing

00:17:42,509 --> 00:17:47,730
to orbit this time of course we have the

00:17:45,240 --> 00:17:49,589
mplm the mplm will have about 15,000

00:17:47,730 --> 00:17:51,269
pounds of cargo inside it and we have

00:17:49,589 --> 00:17:53,730
the mid deck in the mid deck will hold

00:17:51,269 --> 00:17:56,099
about another 8,000 pounds of cargo in

00:17:53,730 --> 00:17:59,400
the mplm I looked at the list yesterday

00:17:56,099 --> 00:18:03,058
we have a lot of clothing a lot of food

00:17:59,400 --> 00:18:05,190
to the tune of about 4,000 pounds and of

00:18:03,058 --> 00:18:08,160
course we want to put the space station

00:18:05,190 --> 00:18:09,990
in a good position to to be

00:18:08,160 --> 00:18:12,150
self-sustaining for up to a year and

00:18:09,990 --> 00:18:14,099
that's that's about what it takes we're

00:18:12,150 --> 00:18:16,980
also taking a lot of environmental
supplies of course we have the urine processor on board and that requires a fairly scheduled and systematic delivery of filter tanks but they call them our FTAs it's a kind of a it's a urine collection tank so we'll be taking a six or seven of those a lot of other components for the environmental system I think a hydrogen dome on there which is a part of the the Ogier the oxygen generating assembly other components just for daily life aboard the space station we'll be bringing back an awful lot as well we'll
bring back a heat exchanger and then as

I had mentioned a lot of the components that were we're a station full-time

aboard the ISS just to support the space shuttle we can bring that all back with

so like I said in addition delivering awful a lot of cargo were also hoping to

offload trash maybe things that could be repaired and sent back up on the ATV or the HTV at a later date now the logistics modules the MPL m's have been installed on the underside of unity lately on the underside of Harmony on the node - but this would be the first
time you have to install one while that

or does it change the how you go about

procedures are very similar

what's interesting and I didn't

realize this until until we got into the

planning of the mission is that the

space station software was never

designed to accommodate more than one

Logistics Module it always assumed there

would be one on board of course with the

PMM there permanently
that is one Logistics Module so we're

00:19:59,990 --> 00:20:04,220
going to add another one and we've had

00:20:01,730 --> 00:20:06,380
to perform a little I guess sleight of

00:20:04,220 --> 00:20:07,730
hand to get the space station to believe

00:20:06,380 --> 00:20:10,070
that there's actually two logistics

00:20:07,730 --> 00:20:11,390
modules on board and I think the

00:20:10,069 --> 00:20:14,450
ultimate plan will be that we'll

00:20:11,390 --> 00:20:16,940
timeshare communication with them so we

00:20:14,450 --> 00:20:18,830
can turn one on so we can not be

00:20:16,940 --> 00:20:22,400
monitored for health and status by the

00:20:18,829 --> 00:20:23,720
the ISS computers and then we'll turn

00:20:22,400 --> 00:20:25,940
that one off and turn the other one on

00:20:23,720 --> 00:20:27,920
so that's been the one interesting facet

00:20:25,940 --> 00:20:29,180
but as far as procedurally we're going

00:20:27,920 --> 00:20:30,660
to pull it out of the payload Bay and

install it

the no.2 which is the most forward module on the nadir port on the bottom which will be it'll look just like the PMM it'll be about male 40 or 50 feet forward other then so it doesn't interfere with the arm operations or no we don't anticipate it one another big event that is happening on this flight on flight day five is going to be a spacewalk although this one's going to be conducted by two of the station crew members rather than shuttle crew members why why the change in assignment yeah
again we get back to the four crew members we just don't have the resources usually when you stage an Eevee a when a shuttle is there it's a it's an all-hands evolution with six or seven crew members if you just kind of count the bodies you have someone has to suit up the the EBA crew members to get them out the door somebody is usually the choreographer that what we call the IV intravascular officer aboard the shuttles that's two we usually have two more bodies supporting the EBA for robotics because usually most epa's do
need some form of robotic support and

the CVA is no exception so you can see

just by Counting we've already used up

our four crew members right there so we

thought what a better resource to

use than the station crew members that

are already there which of course are

Mike Fossum and Ron Garan and it was

kind of a marriage made in heaven Ron

and Mike have done an EPA together

before they're very custom

to one another they're experienced so it

just seemed to work out perfectly to to

bring the station crew member into the


shuttle docked operations and let them

00:22:10,769 --> 00:22:14,970
do the EVM so that's how we that's how

00:22:13,200 --> 00:22:16,740
we focused on that when shuttle crew

00:22:14,970 --> 00:22:18,120
members have done spacewalks station

00:22:16,740 --> 00:22:19,950
crew members have been part of the team

00:22:18,119 --> 00:22:24,479
as well so it's it's just a

00:22:19,950 --> 00:22:27,059
rearrangement of the assign yes well in

00:22:24,480 --> 00:22:29,130
a lot of these EBA situations some of

00:22:27,059 --> 00:22:30,599
the station crew members will progress

00:22:29,130 --> 00:22:33,020
during the Evie a with their with their

00:22:30,599 --> 00:22:35,189
normal timeline and not be too involved

00:22:33,019 --> 00:22:36,930
occasionally we will bring them in and

00:22:35,190 --> 00:22:38,970
even though involv however usually in

00:22:36,930 --> 00:22:41,680
a suit up in the IV portion of things

00:22:38,970 --> 00:22:44,620
but now I mean we are just one where one
real team all eight of us if you will

while we're on board

okay so what's gonna happen during this

space walk when Fossum and Garin go

outside what are they gonna do and what

part are you gonna play okay well first

since my part comes in early we'll get

them all suited up in the airlock and

we'll get their tools on board we'll let

them let them get out and then I'm

essentially free for the balance of the

six hours of the spacewalk I'll probably

go into the mplm and start transferring

a lot of the elements out what Mike and
Ron are tasked to do with Rex Walheim acting as the IV who will be on the shuttle he'll be a choreographer choreographing the EBA for them their first task is to get a pump module that failed on the space station several months ago and bring that back put it in the payload Bay so we can bring it back to earth and do a post-mortem on and find out how it felt we'll also take this robotic refueling module that I'd mentioned this this activity center for the special purpose dextrous manipulator and we'll put that
on the space station after we put the 

the pump module in the payload Bay and

then they'll relocate that robotics you

freely module at some later date so

we're just gonna put an in temporary

location after that a lot of the tasks

have been up in the air right now we're

scheduled to change a camera on one of

the station cameras has a has a zoom

issue so we're going to change that

there's also an issue with another small

payload we'll need to open it up and

expose to space a lot of priorities have

been coming and going I have a feeling

that the final UVA won't completely come

614
00:24:26,170 --> 00:24:29,769
together until just weeks before the

615
00:24:28,539 --> 00:24:32,710
launch and that's not out of the

616
00:24:29,769 --> 00:24:35,349
question they're out of that happens a

617
00:24:32,710 --> 00:24:41,170
lot it does so this is not unusual the

618
00:24:35,349 --> 00:24:44,379
crew has been trained interestingly Rex

619
00:24:41,170 --> 00:24:47,410
Walheim and Sandy Magnus are our EBA

620
00:24:44,380 --> 00:24:48,730
crew members in the event we need an EBA

621
00:24:47,410 --> 00:24:50,259
for any reason of course it's not

622
00:24:48,730 --> 00:24:52,930
planned right now but you always have to

623
00:24:50,259 --> 00:24:55,470
have that capability just in case since

624
00:24:52,930 --> 00:24:58,650
Rex and Mike are essentially gone

625
00:24:55,470 --> 00:25:01,890
either in Russia or on-orbit now in the

626
00:24:58,650 --> 00:25:03,750
case of Ron we are continuing to develop

627
00:25:01,890 --> 00:25:05,159
this EBA for them that sandy and Rex
will continue to develop the procedures

and the plans and run in the neutral buoyancy lab to mature this EBA

completely in the absence of the people

who will actually do it so we have the capability to continually adjust our agenda during that spacewalk right up until the time we launch it it's a nice flexibility to have it's actually a very nice plan yes as you said and after the spacewalk pretty much everybody's going to be devoting their time to the transfer work which almost sounds like packing up a whole house and moving it
while you're moving another whole house

in at the same time what is involved

here in terms of not just moving items

but knowing where they're supposed to go

and what is where at any given time as I

said I did you know at last count it was

about 15,000 pounds of stuff needs to

come out something like twelve or

thirteen thousand pounds needs to go in

and at all it doesn't come in large one

thousand pound chunks it comes in a

series of small 20 pound bags so in

terms of transfer items into this NPM

we'll have about 50% more items just by
item number and how do you keep track of all that and that was the question that you asked I'll tell you there's a outstanding team of folks on the ground who know exactly what's in the mplm they've labeled everything appropriately we have daily list updates and we take the bag with the location code on it we go put it in that location in the space station typically we'll go there we'll pick up something else that's labeled for return we'll bring it back and we'll stage it so we'll try to slowly transfer things out of the mplm while
simultaneously bringing things back in

00:26:43,288 --> 00:26:49,140
it's it's an incredibly efficient

00:26:46,710 --> 00:26:51,419
process but you would never know it to

00:26:49,140 --> 00:26:53,669
look at it on the first couple days it's

00:26:51,419 --> 00:26:55,590
only until the last day or so that it

00:26:53,669 --> 00:26:57,600
really begins to come together and you

00:26:55,589 --> 00:27:01,589
realize that's slowly but surely bag by

00:26:57,599 --> 00:27:03,788
bag you're you're doing this giant dance

00:27:01,589 --> 00:27:07,118
as you get things in and out of the

00:27:03,788 --> 00:27:08,888
pln it's complicated it is if it needs

00:27:07,118 --> 00:27:11,378
to be complicated by the fact that in

00:27:08,888 --> 00:27:13,719
the mplm things are packed in front of

00:27:11,378 --> 00:27:16,209
other things and and you've got to move

00:27:13,720 --> 00:27:17,858
stuff out in order to create room for

00:27:16,210 --> 00:27:20,619
the things that are coming up back yeah
exactly they do try to pack the MPM such

that the things that you need first are

on the front and you want to pack the

things that are on the front as soon as

you removed the the transferred item

before you can rotate these racks down

to get access to the things that are on

the back and what has actually made this

mplm more unique than others is that

typically like I said you could move

things in thousand-pound chunks by

taking an entire rack and moving out and

installing it in a location on the space

station and for the first time in my
memory we are actually not transferring

a whole rack it this is all bag by bag

by bag by bag all the racks that are in

the mplm will stay in there so no big

packages they're all small packages it's

gonna take a lot of coordination and

this is going to go on for several days

we have about three and a half days

devoted to it if you had to tally it up

in man-hours it's about a hundred and

forty man-hours we have some support

from our Russian crew members because

we're just flat short-handed up there so

it's a it's a multinational event to get
that mtlm empty didn't refilled again

when that's all done the joint time line

is over you and your three crewmates are

going to mark a milestone with the last

undocking of a space shuttle from the

international space station is there

anything special on the plan for the

undocking operation itself as Atlantis

finishes the shuttles mission at the

station well we do have we have one

thing on the docket that is unique and

for the undocking will back out to about

600 feet and these plans are well and

work and I think that they'll actually

00:28:35.619 --> 00:28:40.879
come to fruition at that point the space

station control team will yeah the space

station ninety degrees so for the first

time in a very long time and maybe

forever we'll have a real nice view of

the side of the space station we've all

been very accustomed to these views

where the Space Shuttle will do a 360

degree fly around

but it always flies around along the

axis of the station so we have great

views but they're the same repetitive

views from the same axis we always see

the front we always see the back and you

see the top and the bottom now what
we'll do is we'll rotate the station 90

degrees to the side and we'll fly around

that way so we get to see the side views

and it'll be I'm sure they'll make some

spectacular photos but it also has a

very sound engineering value in it

prolonged exposure to the space

environment does eventually wear on

these items there's little

micrometeoroid orbital debris hits

around station that we can document very

well but we haven't seen the side of

station in quite a while so we're

certainly hoping that this will
will come too and and I think it'll be a
real nice cap because we just really
won't have many options like this in the
future and being that it's the last
shuttle to leave we should take full
advantage of it along with that
documentation there anything else you're
gonna be keeping your eyes peeled for as
you make that the last fly around in the
final separation
well I'm sure there'll be a lot of
inspirational reflections on on the
history of the shuttle and the space
station of course the station couldn't
exist in the current form that it is

today without the shuttle that did the
lion's share of the heavy hauling up

there you know as far as we're keeping

our eye out for we want to make sure

sandy is on the right side of the hatch

of course she enjoyed her time on the

space station but we're really gonna

need it we're gonna be very busy after

we undock and I'm gonna make sure

everybody's on board so it'll be an

emotional moment I think for for a lot

of folks who have seen the shuttle

essentially build the better part of
Space Station and to know that this will
be the the final time it leaves and I'm
sure we'll have some good words for that

when you were assigned to this flight it
was a rescue flight for the last shuttle
mission and it was supposed to have
already flown by now but schedules have
changed course what was your reaction as
you realize that hey I'm on the last
space shuttle mission well there wasn't
an Alleluia moment if you will I mean
this came in in a whisper that perhaps
we would try to fly this last flight but
it wasn't funded it was a long shot you
know you're gonna train for a rescue
mission and then maybe we'll upgrade you somewhere near the end and it eventually built in a crescendo that occurred over a period of maybe nine months well even after we were assigned in training as a crew at which point I would say we were 50/50 at best now as we approach launch I'd say the odds are slightly better but I still won't believe it until the SRBs fire and we're on our way but you know that the realization of and the significance of being on the last space shuttle flight yes it's it's an honor but it's not one that that I think
anyone else felt like we're particularly qualified for certainly I mean there's a lot of great folks in our office any one of which could assume this role and some of which could probably do a much better job but but you know being what it is this is where we are will will rise to the occasion and we we do consider ourselves extraordinarily fortunate well people would want to know is is there a special sense of honor or responsibility of being one of the being the last crew I'll tell you pulling off a mission with a crew of four is is going to be
challenging that said we're heads down and marching forward someday the realization that this may and likely will be the last flight will hit us I would like to defer that emotion until after the wheels are stopped on the runway because at that point I think the finality of everything old truly will truly hit us are there Inklings of that right now you know do we see that right now that hey you know this this could likely be it and you might luckily be on the final shuttle flight yes it's
starting to creep in but we try to push

that to the side and we want to execute

this mission as safely as any shuttle

mission that has preceded it now the end

of the program does mean a lot of

changes at NASA including some layoffs

and including shutting down some

historical facilities and and you've

seen that everyday in your training what

your feeling about the decision that was

made to stop flying these vehicles well

let me touch on your point about the

layoffs you know i've had underestimated

a few things about this flight one of

them was the the impact of watching a
lot of friends and watching a lot of people who you know have worked long and hard on the shuttle program move on and it has actually added a little bit to the workload if you will because there's a certain compulsion you want to thank everyone you know you want to tell them that their time and their service has been so appreciated and they know that but you still feel like there's a certain there's a certain part of you that wants to thank them for what they've done and we do try to take the time out to do that just recently we
were at an evolution at the Kennedy Space Center called CIT its crew element integration test while we were there a rather large layoff occurs and we were in a room where that morning was going to be the last day for several people who introduce themselves to us as you know I'm I'm so-and-so and I've been working here at the Kennedy Space Center for 43 years and that just takes you back it's like wow after 43 years so it has been an emotional time for the people of course who are getting
ready to leave and it's been kind of a

you know it's been emotional for the

crew to see them go because you know

they have families a lot of them have

their well provided for and you know

they're very marketable skills so

they're finding jobs but it does

it does affect you I hope I've answered

your question in there somewhere

well recognizing all of that which is is

undeniable how do you feel about the

decision that was made OK it's time to

stop flying these vehicles yeah well it

was a tough one but the decision was
made 2003 so we've known this was coming

for for eight years now there's two

camps out there one camp says you can

continue flying the shuttles for another
ten years

no problem they're healthy they're you

know relatively young they were designed

for a hundred flights some of them have

only flown 33 35 flights but they were
designed to fly 100 flights over a

20-year period now we're now thirty

years into the program so there are

other issues that you deal with aside

from the fact that you haven't flown as

many flights on them that you would
think obsolescence is a big one you know

we have a lot of elements in the Space Shuttle which are difficult to maintain

because they were built with technology that was 35 years old there's life and

fatigue items there's some areas of the space shuttle that we really haven't delved into to inspect in a very long time well you you hate to see old airplanes retire old rockets do become old and you begin to wonder whether the risk of them getting old is worth the reward of continuing for an additional 10 or 15 years or
00:37:30,750 --> 00:37:35,449
what-have-you so I certainly understand

00:37:33,239 --> 00:37:38,069
the decision I understand there are many

00:37:35,449 --> 00:37:40,049
different opinions out there on whether

00:37:38,070 --> 00:37:41,519
we can continue to fly them longer but

00:37:40,050 --> 00:37:45,570
the decision was made eight years ago

00:37:41,519 --> 00:37:48,030
and we've known that this was coming and

00:37:45,570 --> 00:37:50,039
we've had time to prepare and to ask you

00:37:48,030 --> 00:37:51,840
about some of the elements in the patch

00:37:50,039 --> 00:37:53,009
that's on your shirt now you that was

00:37:51,840 --> 00:37:55,829
designed knowing this

00:37:53,010 --> 00:37:58,650
be the last mission some of those

00:37:55,829 --> 00:38:02,340
elements are emblematic of that right

00:37:58,650 --> 00:38:04,619
well we tried to without being overt

00:38:02,340 --> 00:38:06,360
about it insinuate that this was in fact
the last flight and hence the Omega

interestingly in the Apache was designed

by Rex Walheim wife Margie who just did

a fantastic job on it so we didn't want

to be too far out there but we did

want the subtlety to come through and

you know when somebody looks at the

sts-135 patch they said oh yeah it's the

Omega that's the last flight what do you

think are some of the most significant

moments in Space Shuttle history no I'll

tell you definitely STS 1 I was a college student at the time and this

a vehicle that the first time it ever
lifted off the pad it was occupied by

00:38:45,440 --> 00:38:52,829
two folks two brave folks John Young Bob

00:38:49,469 --> 00:38:54,419
Crippen and he just looked at it on the

00:38:52,829 --> 00:38:56,519
pad you said this looks like no other

00:38:54,420 --> 00:38:58,710
rocket that I've ever seen before it's a

00:38:56,519 --> 00:39:00,030
you know got huge boosters a tank in the

00:38:58,710 --> 00:39:02,280
middle and it's got the equivalent of an

00:39:00,030 --> 00:39:04,350
airliner hanging off the side and even

00:39:02,280 --> 00:39:06,150
though today by today's standards it's

00:39:04,349 --> 00:39:08,339
it's very common sight we're used to

00:39:06,150 --> 00:39:10,079
seeing it you know by the early 80s

00:39:08,340 --> 00:39:12,809
standards it was completely

00:39:10,079 --> 00:39:14,699
revolutionary and to know that it wasn't

00:39:12,809 --> 00:39:16,739
really wasn't going to fly a test flight

00:39:14,699 --> 00:39:18,509
it had flown some gliding landings but
it hadn't flown a real test flight in the first time it was going to fly it was going to have to two people on board that was a major milestone you know of course the shuttles also delivered many of the the Great observatories Magellan Compton gamma-ray the Chandra x-ray telescope of course Hubble some monumental and scientific breakthroughs as far as observatories have been launched so there's a lot of major milestones how does it lantus the stick out in that what's Atlantis's place and all that history well I had
looked a little bit into Atlantis is

history and it's very interesting of

course its first flight was 1985 it

launched some of these observatories the

Compton again

Marais Observatory had launched Magellan

it was actually the most frequent

visitor to mirror I didn't know that we

had we had a phase 1 program in the 90s

where we visited the the Russian Mir

Space Station and Atlantis made seven of

the eleven trips back and forth so Linus

really became the cornerstone of docking

operations with an orbiting space
vehicle and of course it factored heavily into the construction of the International Space Station last Hubble servicing mission there's a lot of claims to fame for Atlantis and then we'll try to send her off in good fashion on the point about the the Space Station Wow what kind of Space Station do you think we'd have today if we hadn't had the space shuttle to use to build it it'd be a lot smaller that's for sure and I saw an interesting statistic the other day that really hit home with me
and I'll give it to you just because it

does factor into this whole space

station discussion you know of all the

launchers in the world Apollo Gemini

mercury proton Zenith long March from

every country and every space launch

that has ever occurred if you had to add

together all the mass that's been taken

into low-earth orbit the space shuttles

have delivered more than half of it I

mean that is impressive if you think

about it

and it gets even more impressive when

you talk about what has been returned

from war but of course there's very few
vehicles that can bring stuff back from space in most cases in the case of trash or spent satellites they usually just burn up as they re-enter the atmosphere but the Space Shuttle has the capability to bring a lock back and of all the mass that's been brought back from low-earth orbit the Space Shuttle has brought 97% of it back so to get to your point about what would the Space Station look like well it did the lion's share the hauling I mean the Space Station was built with the Space Shuttle in mind and the modules all fit in the bay I think Space
Station is close to 900,000 pounds right now most of it delivered by the space shuttle I don't think the station would look anything remotely close to what it does today for the shuttle when after STS-135 it's then I'm gonna be up to spaceships from other nations and perhaps private industry to get cargo and crews up there as an American astronaut how do you feel about the future for the International Space Station well I station has a bright future you know the construction is done so
everything that the shuttle needed to do

is done so it's really logistic support

at this point and I think our commercial partners can pull that off of course

it's they haven't demonstrated that

capability yet but SpaceX orbital are making strides in that direction SpaceX

has had a successful orbital flight and

it's had actually had a entry that was very successful as well where it landed

in the Pacific Ocean so we we are making steps in that direction of course we have our international partners to ATV

the autonomous Transfer Vehicle which is

a European product and HTV is a Japanese product which have performed flawlessly as well so as far as the long-term health of the space station I think it's positioned very well logistically. STS-135 will get it in that great shape. just to count you know we always hope for the best plan for the worst so we'll put a bunch of things on station to get in a good spot just in case we have some hiccups along the way for some of our commercial providers what's your favorite memory from the Space Shuttle era yeah I had to think really hard about this one and there's a lot of them.
and a lot of them just involve the
thrill of getting to fly on a couple space shuttle flights but if I think about it in terms of engineering
challenge things that were really out there real time planning how did the shuttle demonstrate its flexibility is a reusable spacecraft
I'd have to focus on sts-49 where we had a problem grabbing a needle set satellite the grapple fixture of course you know that's you know that satellite was stuck in a band orbit and we had to go do
something about it so we sent three

space walkers out unprecedented had never

never done that before and they just

stood in the payload Bay and they just

grabbed this huge satellite and he

plugged it in and they did all the work

they needed to do to it and send it on

its way and I think that just epitomized

that the flexibility of what the Space

Shuttle is all about how is the work of

the shuttle program gonna be remembered

something like that you think well I

think you know shuttle program is

extraordinarily flexible you know we I
think when we started we didn't really have the space station and it was it was in mind but it wasn't on paper and of course the way that the MIR program was brought in in the middle again demonstrates how flexible it was we had this platform that could go up and down on a routine basis and we didn't quite know exactly what we were gonna do with it for its 20 or 30 or 40 year history but we have managed to adapt it to be so many different things over that period of years I think that if you look back on it you would say that that is its
true hallmark is its flexibility

1127
00:45:32,000 --> 00:45:36,750
remember where you were when sts-1 tuck

1128
00:45:34,500 --> 00:45:39,179
off you betcha I remember exactly where

1129
00:45:36,750 --> 00:45:42,630
I was I was a young engineering student

1130
00:45:39,179 --> 00:45:44,789
at Drexel University and I was

1131
00:45:42,630 --> 00:45:45,539
mechanical engineer I wanted to be a

1132
00:45:44,789 --> 00:45:49,619
pilot

1133
00:45:45,539 --> 00:45:51,150
I wasn't file it at the time but and I

1134
00:45:49,619 --> 00:45:53,250
was just fascinated by this kind of

1135
00:45:51,150 --> 00:45:54,660
stuff ever since the Apollo days I

1136
00:45:53,250 --> 00:45:57,300
remember being you know a kid and

1137
00:45:54,659 --> 00:45:58,079
drawing these Apollo rockets and you

1138
00:45:57,300 --> 00:46:00,060
know here was something completely

1139
00:45:58,079 --> 00:46:01,349
different you know they'd said it was a

1140
00:46:00,059 --> 00:46:02,579
couple boosters with the tank in the
middle and this equivalent of an airliner hanging on the side it was the most unimaginable I see this thing launch so I go from class to class I think there was one cancellation where they scrubbed it for 24 hours and you know I'd kind of try to update myself and you know I remember watching it on this color television in one of the lounges at school there and I remember my first reaction remember how the Apollo would kind of lumber off the pad it was this slow buildup of momentum and and the space shuttle just it just
jumped off the launch pad by contrast
and then of course it went through this
pre-programmed roll maneuver and nobody
really knew what to expect I mean we had
never seen it before we didn't know what
it was supposed to do and after seeing
it pop off the pad like that and go
through the
roll motion I mean I was like I don't
think it's supposed to do that
of course it was and the rest is history
but I remember exactly where I was for
the first launch destinations of the
Space Shuttle have changed a lot in the
30 years since STS-1 kicked off that era

Where do you think we're going in the next era of space exploration? Yeah

That's a tough one. I don't know. If you had asked me two years ago, I would have said we're going back to the moon and we're going to stay there for a long period of time. Of course, that was Project Constellation. That has since been cancelled. I believe there's an asteroid in our future. I don't really know!

In our future, I don't really think that the moon is a great destination. I think that we should consider that ultimately I'd love to see.
us shoot for Mars of course Mars is

always 20 years in the future and that's

where it's been for the last 40 years

it's been 20 years in the future I think

we belong on Mars and I assume you're

referring to human exploration and I'd

like to consider that as a long-term

goal for the space program to put humans

on Mars

you