

# A Journey: The International Space Station

## An Annotated Storyboard: An Example of How to Create a Digital Story

This was my first attempt to create a digital story, and in fact the first time I had ever done video editing on the computer. As a result, it is not perfect. The original intent had been to create a digital story of no more than about 7 minutes length, that told of some aspect of my life, Work or interests. It was to include a variety of images and videos from several sources, have a soundtrack, and my own narration.

One of the first things you are told when you go to build a digital story, is to create a storyboard to lay out your ideas, scenes, script and thoughts, aims and goals for each segment of the story. This was not how I created this story. I think visually. My first steps were to review my extensive image and video collection to identify source material and a list of topics from which I would begin my work, and from that, to select a series of videos and still images which I would try to incorporate in my story, and lay them out in a meaningful order.

My original idea was to talk about different spacecraft and how they operate. But during the initial review of a preliminary draft of that story, my mentor asked, “why is this meaningful for you” and, when I showed videos of the interior of the space station, he asked “well I see a bunch of stuff, but what is it?” This set me off in a somewhat different direction from where I had started. Since I had had something to do with what he was seeing, that was the story I wanted to tell.

So, I never created a complete storyboard, until long after the digital story was complete.

I am fortunate. While I do have a background in education, as a classroom teacher, college adjunct professor, instructor, lecturer and planetarium director, my undergraduate science degree allowed me to work for NASA for the last 30 years. I have had some not completely insignificant roles in several space programs during this time.

I have always been fascinated by airplanes, flight, space, astronauts and rockets. I think this started about the age of 4 when an older cousin gave me a model rocket as a gift. By the time I was in school, in 1961, the first US astronauts were being launched into orbit and I remember distinctly my first grade teacher, Mrs. Watson, at Dawes Elementary in Pittsfield, Massachusetts, offering me the news clippings of astronauts Shepard, Grissom and Glenn, once she had finished displaying them on the classroom bulletin board. My fascination with air and space became as much about the historic nature of the endeavor as it did the science and engineering of the vehicles. I’ve never lost that interest or that fascination. I’ve been thrilled to have a role in the program.

My goal became to tell that story. In order to be reasonably complete, I wanted to spend the first minute or two telling the preliminary history that led me to my involvement in the space program, then split the remainder of the time between design and development of the space station systems and equipment, and followed by life on the station. I wanted to close with the station’s role in the future development of spaceflight.

While an avid fan of Star Trek, I particularly liked the opening for the ‘Enterprise’ series and felt it would fit well with this story. In searching on the internet I found multiple versions of the show opening, and an instrumental version of the TV show soundtrack, both on YouTube. I would use both in this digital story.

Scene

Scene #

Time

Description

Source and Notes

Script

Note how many of the scenes last for no more than 10 seconds; many much less. I was surprised that you could reduce a scene down to that duration and still get the message across.



1

00:00

Receding star field, with title overlay.

from a DVD of a 1960s NASA film, A View of the Sky. Title and most sequences produced in Sony Vegas software package.



2

00:08

Revolving planets/ orbits overlaid on 'Enterprise' Introduction.

Planet orbits from DVD of 1960s NASA film, A View of the Sky. Enterprise introduction from YouTube, downloaded via Zamzar. Some segments of the clip like the balloon crossing Mountains had to be duplicated and extended in order to make the clip long enough.

Over the centuries, to explore the sky, to reach beyond the earth, to go to the moon and even the planets, were considered dreams.

00:18



3

Color film footage of the Wright Brothers first flight at Kitty Hawk, North Carolina.

Wrights took no movie footage, color not yet invented. This came from a VHS tape of a not well known Movie, The Winds of Kitty Hawk, Produced in the 1980s.

But then, just a little over a century ago, humans went aloft on mechanical wings, defying gravity and defining the realm of possibility.



4

00:23

Color film footage of the Spirit of St. Louis at sunset over the Atlantic Ocean.

From a DVD of the Jimmy Stewart Feature film, the Spirit of St. Louis, produced in the 1960s.

00:26

1927 - Lindbergh Flies New York to Paris

Scene	Scene #	Time	Description	Source and Notes	Script
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5 00:26

Howard Hughes H-1 racer.

from a DVD of the Leonardo DiCaprio feature film, The Aviator, 2004.

Flight beyond our world...



6 00:28

Color film of a V-2 launch.

from YouTube, downloaded via Zamzar. Rocket sound is from the Youtube film.

...became a goal within our grasp.



7 00:31

Color film of Bell X-1 launch and sequence. The Bell X-1 was the first plane to break the sound barrier, flown by Chuc k Yeager.

Several brief sequences, from DVD, excerpted from the feature film the Right Stuff. There were few color sequences of the real X-1, and most were from a distance, so they were not nearly this exciting. They were More 'documentary'.

By the end of World War 2, progress in airplane design...



8 00:35

Color film of Douglas D-558 launch to twice the speed of sound.

*Airplanes, particularly supersonic planes And the 'century series', were what I was reading about and learning about In my first several years.*

...took us through the sound barrier...

00:38

Brief excerpt, from the NASA website: <http://www.dfrc.nasa.gov/gallery/mov/e/D-558-1/index.html>. There were few color sequences of the D-558, and though this was not a great clip to Include, my criteria for realistic and color sequences left me with few other options.

Scene	Scene #	Time	Description	Source and Notes	Script
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Note: I wanted to maximize motion, with vehicles moving towards and from the viewer.



9 00:38

Color Bell X-2 clip.

Brief excerpt, either from the NASA website:  
<http://www.dfrc.nasa.gov/gallery/Movie/X-2/index.html> or from Youtube.  
 Some of the best sequences of the X-2 came from the 1950s feature film *Toward the Unknown*.

And then two times and three times the speed of sound.



10 00:41

Several X-15 clips.

Brief excerpt, from the website:  
<http://www.dfrc.nasa.gov/Gallery/Movie/X-15/index.html>. The scene on the left is actually when the aircraft is moving very closely, just prior to landing.

The last of the rocket planes took astronauts to speeds of 4500 miles per hour and 75 miles altitude ...

*Originally the X-15 was supposed to be the first US manned spacecraft, by lost out to Project Mercury. The X-15 was of great interest in the 60s, and I ready about it in the Mike Mars series, and made the Aurora and Revell model kits.*



11 00:48

Clip of actual Sputnik launch.

I think this came from Youtube, but that they'd gotten it off a Russian video website as noted by the logo at the upper right.

...at the edge of space.

We were engaged...



12 00:51

Clip of actual Gagarin launch.

This came from Youtube,.

...in a cold war...

00:53

1961 - USSR launches the first man in space - Gagarin

Scene

Scene #

Time

Description

Source and Notes

Script



13 00:53

Clip of Vostok launch.

I think this came from Youtube.

...our arch-rivals, the Soviet Union, seemed to be ahead, launching the first satellites and then the first man into orbit.



14 00:57

Clip of Mercury-Redstone launch.

From a DVD of the Tom Hanks HBO series, From the Earth to the Moon.

...the 1960s became the decade of the moon race.

Note how exciting commercial films and TV make the sequences with rockets coming and going, moving towards and away from the viewer.

*By 1961 and 62, when I was 6-7 yrs old, I was fully enamored with the space program, clipping articles from newspapers and magazines and watching missions on TV. I became known to my teachers as a 'space nut'.*



15 01:04

Clip of Alexei Leonov during the first spacewalk in March, 1965.

From Youtube.

...we pulled ahead of the Russians, after their first spacewalk with our two man Gemini ...

*I remember 1964 in particular, was very slow because there were no space launches for most of the year. I was in Scouts, and Boy's Life had an extensive space article in October, which I received just about the time of the first Russian multi-man Voskhod mission.*



16 01:08

Clip Gemini 7 in orbit, in December, 1965.

From the Discovery Channel DVD set, When We Left Earth, in which they cleaned up and did some first generation copies from official NASA footage.

...we pulled ahead of the Russians, after their first spacewalk, with our two man Gemini spacecraft, we learned to rendezvous, dock and walk in space...

*In 65, particularly, there was a mission every month or two, and with spacewalks and rendezvous', lots of really great photography. My neighbors and barber were by this time making sure I got their newspapers, weekly magazines, and anything else with space articles.*

01:13

Scene

Scene #

Time

Description

Source and Notes

Script

Note: Even though a lot of documentary footage is available, I thought that in many cases animations or simulations were more effective.



1965 - First American Spacewalk - Ed White

17 00:53

Clips of Ed White's spacewalk in June, 1965. Some are actual footage. The scene to left is a simulation or model and is not real.

Real scenes are from Discovery Channel When We Left Earth. Simulated scene is from the From the Earth to the Moon set. I like the simulations since they show the overall scene with spacecraft and astronaut, something you don't get from the real footage.

"...my feet are out. I'm draggin a little bit and don't want to fire the gun. .really a wonderful experience, just tremendous."  
-actual air-to-ground of Ed White during his spacewalk

01:21

*While the 1965 missions were really exciting, there was no live TV during the missions and The network TV channels would simulate spacewalks using puppets. They'd simulate rendezvous using trains going around in circles.*



1967 - the largest rocket, Saturn V first launch

18

Clips, simulated Saturn V moon rocket Launch and staging.

Simulated scene is from the From the Earth to the Moon. Real footage was 'documentary', not as exciting as this.

We were building the moon rocket, the largest and most powerful flying machine ever. The crew of Apollo 8...

*Being there, I saw one Saturn launch, was really an experience of sound, light and feeling as you really felt the reverberation more than anything else.*

01:29



1968 - Apollo 8 Views the first Earthrise from Moon orbit

19

Clip of Apollo 8 in orbit around the moon with earth in the distance.

Simulated scene is from the From the Earth to the Moon. The only real footage was from the first air-to-ground TV was pretty crude of the lunar surface, or a fuzzy blob we were told was earth. Not until the astronauts came back to earth did we get good clear images from the first moon flight.

...was sent to orbit the moon where they saw the first earthrise.

*Apollo 8 was really exciting. I was almost 14, had Just taken my first flying lesson. The mission was during Christmas vacation, and the exciting lunar Orbit insertion was in the middle of the night-the first time I ever stayed up all night.*

01:32



1969 - First Landing on the Moon - Apollo 11

20

The Apollo 12 lunar module in orbit over the moon.

This is actual footage of Apollo 12; it was much better than 11's. But the original film was taken through a mirror, and so the scene is backwards, and the LM was traveling top first. In order to get this clip I had to reverse the image and run it backwards. It shows what the LM would have looked like during its descent to the moon, though from a standpoint of accuracy, during the first part of the descent the windows faced the moon so the astronauts could figure out where they were.

...only six months later, the Apollo 11 astronauts took their...

01:34

Scene

Scene #

Time

Description

Source and Notes

Script



21 01:34

Simulation of the Apollo 11 descent to the moon.

From the From the Earth to the Moon DVD. There are no real views like this because the only views were movies taken by a data camera looking out the window.

...spaceship the Eagle to land on the surface of the moon.

Following the missions during the 60s was actually pretty difficult even for those of us who were really interested. There was coverage during the missions, through Apollo 11 on the 3 TV networks (NBC, my favorite, CBS and ABC). But NASA's focus was always on the next mission. Other than Newspaper or

magazine articles there was little that ever came out after the missions. I started writing to NASA about once a week asking for whatever they could send. Once Gilruth's secretary sent me a letter: "weve sent you everything we have. We don't have anything more". It did not deter me.



22 01:39

Actual film footage taken on Apollo 14.

Movie by Alan Shepard of taken of Ed Mitchell descending the ladder of the LM. No other mission had such a clear view. Most movies shot on the moon using the Maurer data camera were set to a slow motion speed setting so the images were very jumpy. This is one of the few that really looked good just as they took it.

...that's one small step....  
Neil Armstrong became the first man to walk on another world.



23 01:47

Actual film footage taken on Apollo 14.

Movie from a camera mounted on the MET. I had to do some editing to make this one come out the way it did.

They set up the flag. They talked to the President. And only a few hours later launched To return to earth.

*Although the later moon missions got better and color TV cameras, and did a lot more exploring in their lunar rovers, coverage of the missions by the TV networks was not nearly as good, complete or thorough after the first moon landing on Apollo 11. On Apollo 13, in April, 1970, the astronauts were enroute to the moon and sent back a TV show, but none of the networks covered it. I went to bed by around 9:30 PM. In the meantime, the spacecraft exploded and the astronauts were very much in a life*

*and death the astronauts were very much in a life and death struggle to save their lives, but I slept through it all and did not find out what was happening until the next day at school. Coverage of the later missions was even worse. The moon walks, when the astronauts were using the rovers, the TV channels would come on for about 5 minutes each hour to give an update.*



24 01:54

Actual TV footage sent from the moon during the mission of Apollo 17.

The TV came from a camera mounted on the Lunar Rover. Only the last 3 missions had this. The camera had to be operated from earth. This footage was the best of the 3 missions.

After 6 moon landings, the last astronauts left the moon in 1972.

*I was trying to keep the entire Digital Story to under 7 minutes (I didn't succeed) and the preliminary history of the space program leading up to my involvement, in Space Station, to under 2 minutes. This was quite a challenge to cut the film clips back to only seconds each. Trying to fit in as much text as I wanted to along with the clips was also a challenge.*

02:01

Scene

Scene #

Time

Description

Source and Notes

Script

25 02:01



Series of 19 images, each presented for about 1 second, illustrating different Space station configurations.

These are images that came from original works published over more than a century. I'd scanned each and cleaned them up in a photo editor. This is actually a small subset of a series of images I compiled for a paper presented some time ago:

<http://www.spacearchitect.org/pubs/IA-C-02-IAA.8.2.04.pdf>

After the moon landings, NASA built the Space Shuttle. The Shuttle was designed to build and service a space station, an outpost in the sky. First ideas for space station went back to the 1860s.

26 02:06



One of the series of 19 space station images, shows a design by Kraft Ehrlicke based on the Atlas ICBM missile.

This image actually came from the cover of a plastic model kit. I purchased and made the kit in the early 1960s. For this image I scanned the box top and then did some editing.

Since that time there had been more than a hundred different designs for a space station. Then, in 1984...

27 02:19



Reagan in front of a US flag

This image came from Google images. A second image showing Reagan and British Prime Minister Thatcher with a model of the station was scanned from a newspaper article.

President Reagan announced we would build the International Space Station.

28 02:23



That's me floating weightless in the NASA KC-135, Vomit Comet.

This image was taken with a Polaroid instant camera by a friend. It was a pretty poor image, but the only decent one I have showing me floating weightless.

I was working for NASA, responsible for equipment flying on the Shuttle, when I was asked to lead the architectural design of the new station modules.

02:31



Scene

Scene #

Time

Description

Source and Notes

Script

29 02:31



From DVD, original NASA footage.

The US had a space station for a short time after the moon program...

Skylab actually preceded Shuttle so this is out of chronological sequence, but highlights the differences in size between a large module, monolithic station, and the Station made of small modules carried by the Shuttle.

30 02:35



TV downlink.

The Skylab was made out of the third stage of a moon rocket . It was huge.

Skylab actually preceded Shuttle so this is out of chronological sequence, but highlights the differences in size between a large module, monolithic station, and the Station made of small modules carried by the Shuttle.

This scene of astronauts running along storage containers inside Skylab was only done his one time. When the astronauts started running it became very difficult for gyroscopes to maintain control of the station.

31 02:41

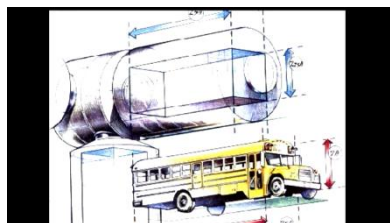


Artistic rendering by Jack Frassanito.

The modules of the new station would have to be much smaller ...

illustrating one possible lay-out of the small diameter modules. This configuration was termed the bologna slice. Illustrations like this are often the first stages of the design process. Frassanito was an industrial designer who had studied under Raymond Loewy and was instrumental in the design of Skylab and the ISS modules.

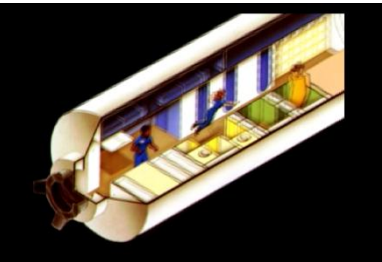



32 02:44



Detail from an educational poster by station contractor Boeing.

... to fit inside of the Shuttle.

02:46

Scene	Scene #	Time	Description	Source and Notes	Script
	33	02:46	Renderings from early design studies of the space station interior .		We looked at how to lay out the interior according to a variety of different schemes.
	34	02:49	Renderings from early design studies of the space station interior .		Universities and contractors
	35	02:52	Full scale mock-up of 'center core' station configuration		Contributed their ideas.
	36	02:55	Full scale mock-up of 'center beam' station configuration	This design eventually led to the standardized modular rack configuration that ultimately was adopted.	Trade studies looked at placing equipment in the centers of the module
		02:58			

Scene

Scene #

Time

Description

Source and Notes

Script

37 02:58

Scanned page from a Design study.

Actual page from a trade study showing grading scheme for different modular configurations.

versus lining the exterior walls.

MOCK-UP CONCEPT 1	EVALUATION SCHEM		5 = OPTIMAL 4 = PREFERABLE 3 = ACCEPTABLE 2 = MINIMAL 1 = INADEQUATE				CUMULATIVE VALUES FOR INDIVIDUAL CRITERIA												
	E1	E2	E3	E4	E1-E4														
ARCH. SUB-SYSTEMS	5	4	3	2	5	4	3	2	1	5	4	3	2	1	5	4	3	2	1
BACKSHELF MODULARITY	5	4	3	2	5	4	3	2	1	5	4	3	2	1	5	4	3	2	1
BACKSHELF FRAME-OUT	5	4	3	2	5	4	3	2	1	5	4	3	2	1	5	4	3	2	1
MODULE LONGITUDINAL FIT	5	4	3	2	5	4	3	2	1	5	4	3	2	1	5	4	3	2	1
MODULE SERIAL FIT	5	4	3	2	5	4	3	2	1	5	4	3	2	1	5	4	3	2	1
CREW ACTIVITY SEPARATIONS	5	4	3	2	5	4	3	2	1	5	4	3	2	1	5	4	3	2	1
SUB-SYSTEMS INTEGRATION	5	4	3	2	5	4	3	2	1	5	4	3	2	1	5	4	3	2	1
<b>TOTAL VALUE FOR CRITERIA GROUP EVALUATION</b>										89									

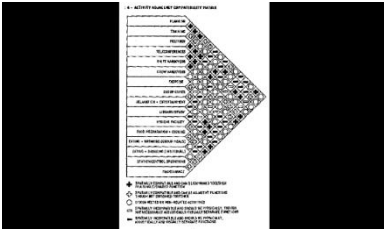
**GENERAL COMMENTS:** The ability of rack arrangement dimensions provides simple interchangeability and reconfiguration. Closure of lower rack edge needs consideration. Crew activity separation capable of further organization.

38 03:01

Scanned page from a Design study.

Actual page from a trade study showing functions, activities and locations within a module.

Integrated before launch...



39 03:03

Full scale mock-up of the early modular rack configuration

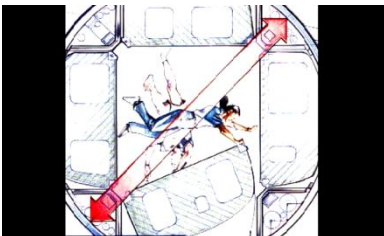
or packages that could be carried back and forth on the Shuttle.



40 03:06

Detail of a Boeing poster showing standardized modular racks, module cross-section

We decided on what we called the standard rack, About the size of a refrigerator... lining the floors, walls and ceiling.



03:10

Scene

Scene #

Time

Description

Source and Notes

Script

41 03:10

scale model, standardized modular rack configuration

small scale model, astronauts are about 5 inches tall of the early standardized modular rack configuration

... lining the floors, walls and ceiling.

42 03:13

mock-up of the early standardized modular rack configuration

full scale mock-up with Full scale simulated astronauts

... racks were needed so that in the case of a puncture of the module wall, we'd be able to repair it.

43 03:17

full scale mock-up of a short segment of the module showing how a rack would mount and utilities connected.

In the white shirt is Jay Cory, one of the lead industrial designers that shepherded the design work. Japanese engineers and managers look on.

... we did a variety of tests to make sure that

44 03:20

Same mock-up as preceding, showing astronaut access in a pressurized suit.

... even the pressure suited astronaut could get behind the racks to fix any possible problems.

03:24

Scene

Scene #

Time

Description

Source and Notes

Script

45 03:24

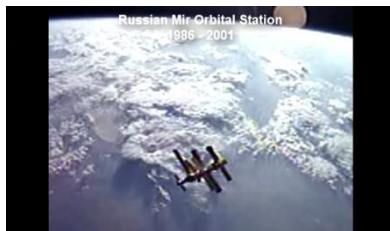


Inside the full scale mock-up of a station module, I'm on the left speaking with Kuniaki Shiraki the Japanese Project Manager and another Japanese engineer

In the back, center, is Jim Lewis who was our Man-Systems Station manager. Jim was also famous as the helicopter pilot who dropped the Liberty Bell 7 into the Atlantic.

I led negotiations with our Japanese and European partners to make sure they accepted our concept.

46 03:30



The Mir station in orbit, photographed from the Shuttle.

From a NASA DVD

By the early 1990s, the Russian Mir station had been in orbit for many years. When the Soviet Union collapsed,

47 03:40



Photograph of Mir and ISS modules at Moscow Krunuechev factory

I took this photo during one of my first trips to Moscow

we were invited to purchase resources on the modules of the Mir for testing Space Station systems

48 03:45



In Krunuechev factory, Russian built FGB module

From the Boeing website

This was called phase I of the Space Station.

03:47

Scene

Scene #

Time

Description

Source and Notes

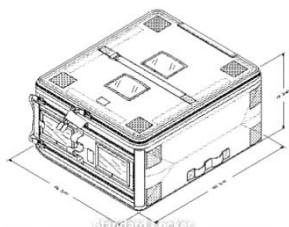
Script

49 03:48

Diagram of a Priroda Transfer Bag

One of the technical drawings out of my Priroda ICD document.

We designed,

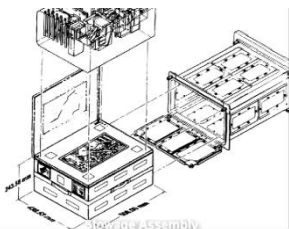


50 03:50

Diagram of a Priroda Transfer Bag . With stowed hardware, and Mir locker

One of the technical drawings out of my Priroda ICD document.

built and tested two tons



51 03:51

Getting ready to leave for Baikonur the first time

I took the photo at Vnukovo Airfield outside of Moscow. The red bus to the right is a rented hearse the Russians used to transport our hardware from the factory to the airplane.

of special lockers, bags, computers, electrical systems and payloads.



52 03:55

Tupolev 134, getting ready to leave for Baikonur the first time

I think this as an Aeroflot charter. They let me take the controls during our flight. We had to make an emergency landing when the airplane iced up and they landed about 50 miles off course, in very cold temps

We lived at the Baikonur Cosmodrome...



03:57

Scene

Scene #

Time

Description

Source and Notes

Script

53 03:57

Me standing beside the Baikonur sign at the entrance to the base

This was taken on a later trip when it had warmed up a bit.

In 40 degree below zero ...



54 04:00

Touring the Buran/N-1 launch pad at Baikonur

A lot of our time during our first two trips to Baikonur was spent waiting to get access to the station module to do integration and testing. I had about a dozen people supporting me during the first trip. Some of the time we went on tours. Here we were walking on sheer ice in minus 40 degree F cold.

...temperatures, preparing our module...



55 04:02

Inside a Baikoneer itarka hut.

While waiting to get into the vehicle we took a side trip to the nearby city of Leninsk. We saw a big celebration. It was Muslim New Years and they invited us in.

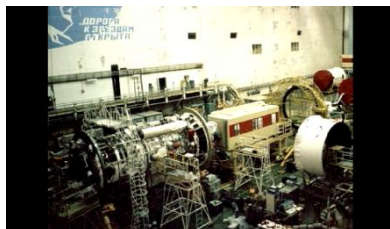
...to fly.



56 04:05

Priroda module at Baikonur.

The module is to the left. The red and beige rectangular room is the 'white room' we would go into before entering the module.



04:07

Scene

Scene #

Time

Description

Source and Notes

Script



57 04:07

Priroda module at Baikonur shortly before launch

This was taken shortly before the module was mounted in the nose cone and on top of the Proton rocket for launch.



58 04:09

Bench review of equipment for first Station missions

A bench review is when most of the hardware stowed on board is laid out for management and crew inspection. This was one of the first ISS bench reviews, I think taken at the Kennedy Space Center. NASA footage.

While my group was busy in Russia, about a hundred thousand Americans were working to design and build the new space station modules we had defined years earlier.



59 04:12

A series of views of space station hardware manufacture in the US

NASA or Boeing footage, probably taken around around 1990.



60 04:14

04:38



Scene

Scene #

Time

Description

Source and Notes

Script

61 04:38

FGB launch at Baikonur, In 1998.

NASA footage.

In 1998, the first module of the new space station launched from Baikonur.



62 04:43

FGB launch at Baikonur, In 1998.

NASA footage.



63 04:46

Node 1 launch from Florida, in 1998.

A series of Shuttle launch scenes from IMAX footage from their Space Station Film and from other NASA provided views.

Just a few weeks later, a Space Shuttle, carrying



64 04:47

the first US built module, launched from Florida.



04:49

Scene

Scene #

Time

Description

Source and Notes

Script



65 04:49

Shuttle launch scenes.

NASA footage.



66 04:57

More than 75 launches over the course of the next 12 years would still be needed to complete the station



67 05:01

but this was the start,



68 05:06

Shuttle in orbit, taken from Station.

NASA footage.

the first Russian and US pieces meeting in orbit. 225 miles over the earth, circling at 17500 miles per hour, Once around earth every hour and a half.

05:11

Scene

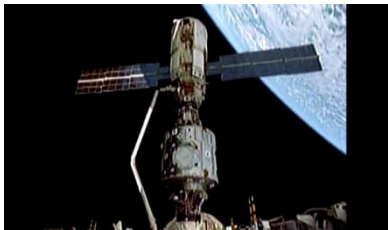
Scene #

Time

Description

Source and Notes

Script



69 05:11

US built Node 1 at bottom, Russian built FCB at top and Canadian robot arm, mounted on Shuttle, to the left..

NASA footage.

Once around earth every hour and a half. The remarkable Shuttle would serve as



70 05:17

Series of interior views showing movement and placement of a rack inside of the ISS

IMAX Space Station footage

the base for construction. Astronauts from the Shuttle would do much of the initial set up and installation before the first astronauts took up residence on the station late in the year 2000.



71 05:45

Although it had been 15 years since laying out the design of the station, it was still exciting to see so many of our ideas launched and assembled in orbit. Standard racks, cargo transfer bags, computers, several of the systems I had developed became the basis for so much of the work on the station.

The standard rack you see here is being transferred from the Shuttle cargo bay to the US Lab and it holds one of our experiments from the Mir, the Gas Metabolic Analyzer.

A thousand pound rack easily maneuvered into position where the astronauts can connect all of the utilities.



72 06:06

06:15

Scene

Scene #

Time

Description

Source and Notes

Script



73 06:15

Series of interior views showing movement and placement of a rack inside of the ISS

IMAX Space Station footage

Here the crew transfers cargo bags that hold clothing, cameras and consumables. A typical crewmember stays on orbit for about six months. Some fly to and from the station on the US Shuttle and others on Russian transports.



74 06:30

Interior of Russian service module, Ken Bowersox on treadmill.

NASA footage

In weightlessness, over six months or longer, the astronauts muscles atrophy; bones lose mineral mass. This requires at least two hours of exercise every day.



75 06:40

Interior of US Node, Leroy Chiao using the resistive exercise device.

NASA footage

The station carries two bicycle ergometers, treadmills, resistive exerciser which serves in place of weight lifting.



76 06:49

Mike Fincke does a medical checkup on Genady Padalka.

NASA TV

Routine medical checkups either by doctors on board or on the ground make sure that each astronaut's health is maintained throughout the mission.

06:55

Scene

Scene #

Time

Description

Source and Notes

Script



77 06:55

Meal preparation in service module galley.

NASA footage

In the Russian habitation module, a fully equipped galley is used to prepare food. Russian food is frequently packed in vacuum tins; US food typically in foil or plastic pouches. This small suitcase is a food warmer. Fresh fruits and vegetables arrive with every resupply ship. Tortillas are used instead of regular bread in order to keep the crumbs to a minimum. Salt and pepper are served, dissolved in water.



78 07:23

Sleep compartment in Russian service module

NASA footage

Each astronaut has their own sleep compartment. The sleep compartments are lined with polyethylene for protection against the increased radiation in orbit.



79 07:31

Computers in US Lab

NASA footage

Almost all systems on the US side of the station are operated by laptop computers,





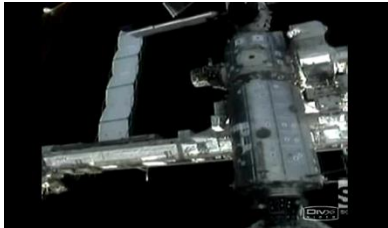

80 07:36

First ISS crew

IMAX Space Station

and almost anything that can be done by the compute on board can also be done by mission control on earth.

07:45

Scene	Scene #	Time	Description	Source and Notes	Script
	81	07:45	ISS spacewalk	NASA TV	Spacewalks have become commonplace on the station. The astronauts look forward to going outside. You would think that as you leave the hatch to exit the spacecraft, you might want to think of which way is up or down with respect to the earth. But that's not really true because all of
	82	08:05	ISS spacewalk	NASA TV	your attachments, your handholds, everything you're interested in is right there on that space station and you really don't care where the earth is, unless of course your taking some pictures.
	83	08:16	ISS fly around	NASA TV	The international space station is a great multinational, technological and political achievement. It's the latest step
	84	08:26	ISS fly around filmed from Shuttle	NASA TV	In mankind's quest to explore and live in space. Research conducted on the station may be applied to areas of science to enable us to improve life on earth. The station affords a unique opportunity to serve as an engineering testbed for flight systems and operations for future exploratons.
		08:46			

Scene

Scene #

Time

Description

Source and Notes

Script

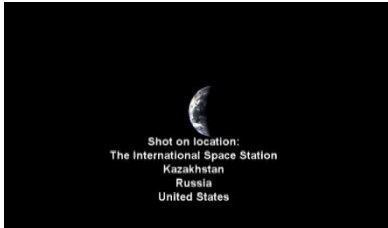


85 08:46

Actual footage of rotating earth.

This is footage from the NASA Messenger spacecraft going to Mercury. Actually, this film of the rotating earth was taken as the Messenger approached earth, so in order to make it appear the earth was receding, I had to reverse the video, and turn it over in order to make sure the earth rotated the right direction.

This research will help enable human crews to venture through the increasingly longer missions and greater distances necessary to visit earth's planetary neighbors.



86 09:00

Filming Locations



87 09:05

Credits for Videos and Still Images



88 09:10

Credits for Soundtrack



88 09:13

09:18