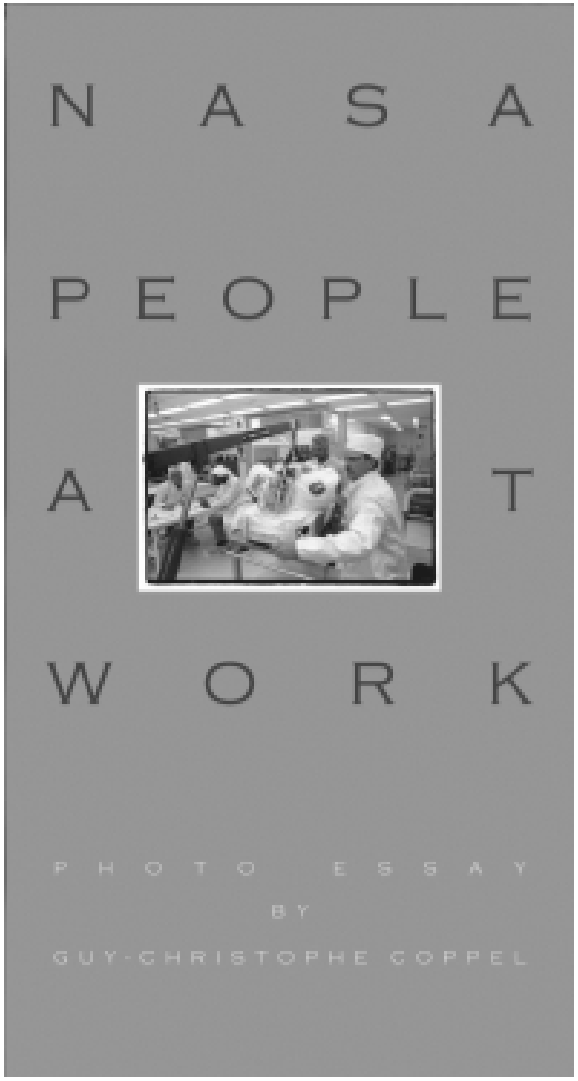
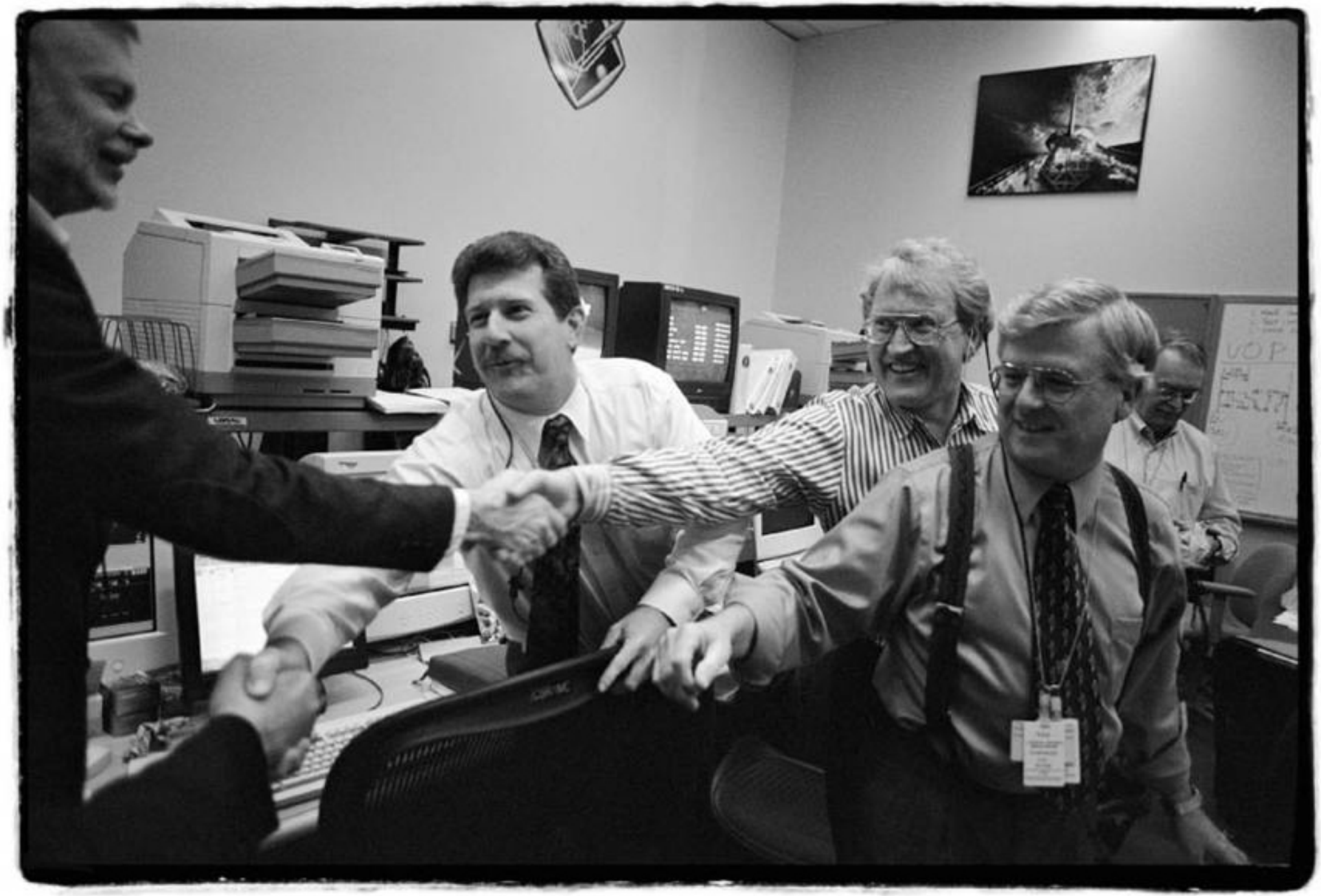
The NASA People At Work Project



(Activity version for printing)

Directions: Print one copy of each slide. Pass out photo slides first. Have students observe and infer. Next pass out the description slides in a different order, and ask students to find matching photos by reading and comparing what they observe in the slides.



4:05 AM Relief

Johnson Space Center
Houston, Texas
March 2002

Excitement, relief and pride are the feelings shared by the Hubble team in the early morning in the support room at Mission Control. This mission exemplifies the versatility of the space shuttle and its ability to provide invaluable expertise in human spaceflight in supporting a scientific space project such as Hubble.

At this very moment, the shuttle robotic arm, which is being carefully manipulated by astronaut Nancy Currie, releases the Hubble Space Telescope that had been captured for servicing a week earlier and docked on board the shuttle *Colombia*. After warm applause to celebrate the success of this difficult task, scientists from academia (from right to left, Dave Leckrone and Garth Illingworth) are shaking hands with the NASA Payload Integration Manager and Flight the Director (from left to right, JJ Conwell and Phil Engelauf).

This happy moment, which concludes years of behind-the-scene hard work for all of them, inaugurates a new life for the space telescope by providing a factor 10 improvement to its capabilities. Some of these people have committed their entire professional lives to the Hubble Space Telescope.

Behind their console in the support room for Flight Dynamic Officer in Mission Control, Joe Jones and Wayne Hensley are entirely focused on the data given by the telemetry on the flight, looking like they were holding their breath during the very intense 8 minutes 30 seconds of STS-108 ascent.

Ascent

Johnson Space Center
Houston, Texas
November 2001

Briefing time for Nicole Stotts and her 16 mates just after the first official NASA picture of the new selection of ASCAN.

Long training awaits these happy few, selected from thousands.

One day, they will represent human kind on the Space Station and hopefully beyond.

Astronaut Candidate

Johnson Space Center
Houston, Texas
September 2000

Back Safe

Ellington Field Johnson Space Center
Houston, Texas
September 2000

STS 106 crew return ceremony. Astronauts Dan Burbank and Ed Lu are greeted with a mix of pride, excitement and relief by flight Director, Phil Engelauf. Deep and strong friendship ties the crews and their teams on the ground way beyond their professional relations. Human Space exploration creates a special link between people involved.

Our ability to share with the general public these particular feelings and emotions on top of the technical information, will definitely shape their understanding and therefore, their support of the Space program.

Brave Hearts

Nacogdoches, East Texas
May 2003

Searching for debris that is sometimes smaller than a business card, but that can be key for the investigation, crews accompanied by a NASA representative have been braving East Texas woods, bushes and swamps under all sorts of weather conditions since early February.

From the freezing cold to the extreme heat, avoiding confrontation with snakes, mosquitoes and cattle, thousands of volunteers walked through 1,000,000 acres in 4 months and recovered 40 percent of *Columbia's* dry weight, which was unexpected considering the conditions in which the accident occurred.

Although, Astronaut Chris Hadfield is a very good musician and singer, this training session was not about music despite the typical conducting gesture of Soyouz instructor Alexei Nikonorov.

This one-on-one class, typical of the Russian method for space training proved itself very efficient along the years.

Conducting a Soyuz Training

Yuri Gagarin Cosmonaut Training Center
Star City, RUSSIA,
May 2002

A specialist, who is assisted by technicians and a highly trained safety team, tests and qualifies in an impressive vacuum chamber a space suit that will be used by the STS-92 crew for extravehicular activities.

In a few minutes, the heavy door will close on the specialist inside his space suit.

Confidence

Johnson Space Center
Houston, Texas
September 2000


100: 16: 15: 30+
100: 11: 15: 30+
102: 20: 15: 30+
001: 19: 30: 55+
204 AGS AOS
204 AGS LOS
205 AGS AOS
205 AGS LOS
19 15 17

Docking

Mission Control (TSUP) Moscow, Russia.
April 2002

Russian technicians have gathered in the NASA support room in Moscow around the computers during a docking of the shuttle *Endeavour*.

They are following the operations to obtain data they do not have on the Russian side. Vladimir Daniev and Joel Montalbano (standing center) are waiting for the capture.


NASA
Grieve

Eight Souls

Johnson Space Center Houston, Texas
Main Gate. February 2003

"Eight souls joined together
Each left a legacy of dreams and love.
Seven taught us to be better people,
One flew as graceful as a dove."

Jeannie Aquino
Excerpt of the poem "Eight Souls"
February 2003

Eyestronaut Dean Eppler

Johnson Space Center, Building 9 High Bay
Houston, Texas
April 2001

You can meet with Dr Dean Eppler hunting for meteorites in Antarctica, testing in Arizona a prototype of a Martian space suit, or working in his humble cubicle on payload integration problems for the ISS at the Johnson Space Center.

From the late Apollo missions to the ISS, this geologist by trade who dreams to flight one day, is one of the typical people who make NASA such an incredible place to be, and work.

Because of his vision and ability to bring together the best of engineers and scientific communities around a daring project, Dean Eppler is considered as the father of the WORF (Window Observation and Research Facility) which will allow World Class Earth Observation on board the Space Station and provide with precious scientific images and data from our small planet.

Here, Dean is showing to potential costumers of this unique facility, the way different type of cameras should be installed behind the precious Hi Tech window.

If not him personally, his vision will fly.


Welcome to
Human Resources

Fairy Gracie

Johnson Space Center
Houston, Texas
June 2002

NASA is often described as an engineering organization. Although this is true in many ways, it should not make us forget that to make this one-of-a-kind organization work, a wholly unassuming, very efficient "people" – made up of administrative personnel – is supporting every aspect of NASA life. Within this group, the secretaries – who are the real "Working Bees" – are key to the success of the space program. This picture is a tribute to all of them.

Shy Gracie Torres, who works for the remarkable Human Resources Office at the Johnson Space Center, is captured here in her "realm" a few days before retiring after 30 years of dedicated service. Smiling, courteous and discreet while leaving daily her busy trail of good mood, FAIRY GRACIE is a typical example of the behind-the-scene people who help to make NASA a legend.

"NASA People At Work" is specially dedicated to them.


FLIGHT DIREC

Flight to Flight

Johnson Space Center
Houston, Texas
May 2002

In the International Space Station (ISS) Mission Controls in Houston and Moscow, Flight Directors and their teams work year-round, 24 hours a day, seven days a week, to support the crew on board the space station Alpha.

The handover between two shifts is always an important moment. Here Sally Davis , Lead Flight Director for the ISS Mission Control in Houston, is briefing Flight Director Mat Abbott on the latest events while listening in on the different "loops" available to obtain the status given by mission controllers in Moscow.

Flying Again. Higher

Kennedy Space Center, Florida
Hangar J6-2466
April 2003

Even if the painstaking task of collecting the debris of *Columbia* and trying to understand what went wrong in order to fix it is for now the main focus, the motivation to do it is simple and overwhelming : Flying again, Higher.

Here, Hal Issen, Technician with United Space Alliance, is trying to identify an aluminum piece of *Columbia* wing structure.

Focus

Kennedy Space Center, Florida
November 2001

To be an astronaut could also be described as being not only a specialist working in space but also as multi-generalist. An astronaut, who already has many skills, has to learn how to take advantage of a unique point of view from space while also documenting, among others, the technical aspect of his mission.

In nearly all aspects of a mission, photography is key. An astronaut has to learn how to be a good photographer and how to use the equipment available in the best way possible. The limited time, supplies and demanding environment an astronaut has to deal with requires that astronaut to train—and train again. Being an astronaut is a never-ending, full-time student job.

Here a specialist in photo training. Tracy Calhoun (assisted by Raul Tijerina), is supervising hard-working astronaut John Herrington, who is discovering the use of the flash capabilities on a Nikon F5 camera while on board a shuttle simulator. A typical shuttle mission brings back to Earth an average of 5,000 to 6,000 pictures. Both traditional film cameras and digital cameras are part of the regular photo equipment of a mission.

Gepetto

Johnson Space Center
Houston, Texas
April 2001

As in Collodi's famous tale, Pinocchio, Chuck Wheelock, of the Robotics Division, and his team are giving life to robots that will one day assist astronauts in their mission.

In the meantime, they are working an amazing piece of equipment, making extravehicular activities safer and, among other things, improving the capabilities of the robotic arms on the Shuttle and the Space Station.

Stay tuned: People in Robotics at JSC are really going to change astronauts' lives and enhance their capabilities. NASA's robots are definitely far removed from Hollywood's fancy robots. Here, Gepetto (Chuck Wheelock) and his creations actually have the "right stuff."

Hubble Shooting

Johnson Space Center Houston, Texas
March 2002

Long before a mission takes place, Lead Flight Directors assess all possible strategies with their teams–especially in the case of a delicate mission. Here Brian Austin, Lead Flight Director for the STS-109 servicing mission to the Hubble Space Telescope, and Dana Wiegel, Lead EVA (extravehicular activity) for that mission, are carefully listening to the possible scenarios – either jettisoning the solar panel, or folding it into *Columbia's* cargo bay and bringing it back to Earth. In the end, the solar panel was not jettisoned but was folded into the cargo bay.

Human Space Flight

Johnson Space Center, Houston, Texas
September 2001

Space suit team at work. A space suit contains the same number of systems as the space shuttle. It is an actual individual spacecraft and now also a vehicle for astronauts in space.

Since nothing is more merciless than the vacuum of space, everyone involved with the fragile marvels of technology is highly conscious of the importance of the quality of their decisions and work. Safety, as the number one priority here, is not just a slogan.

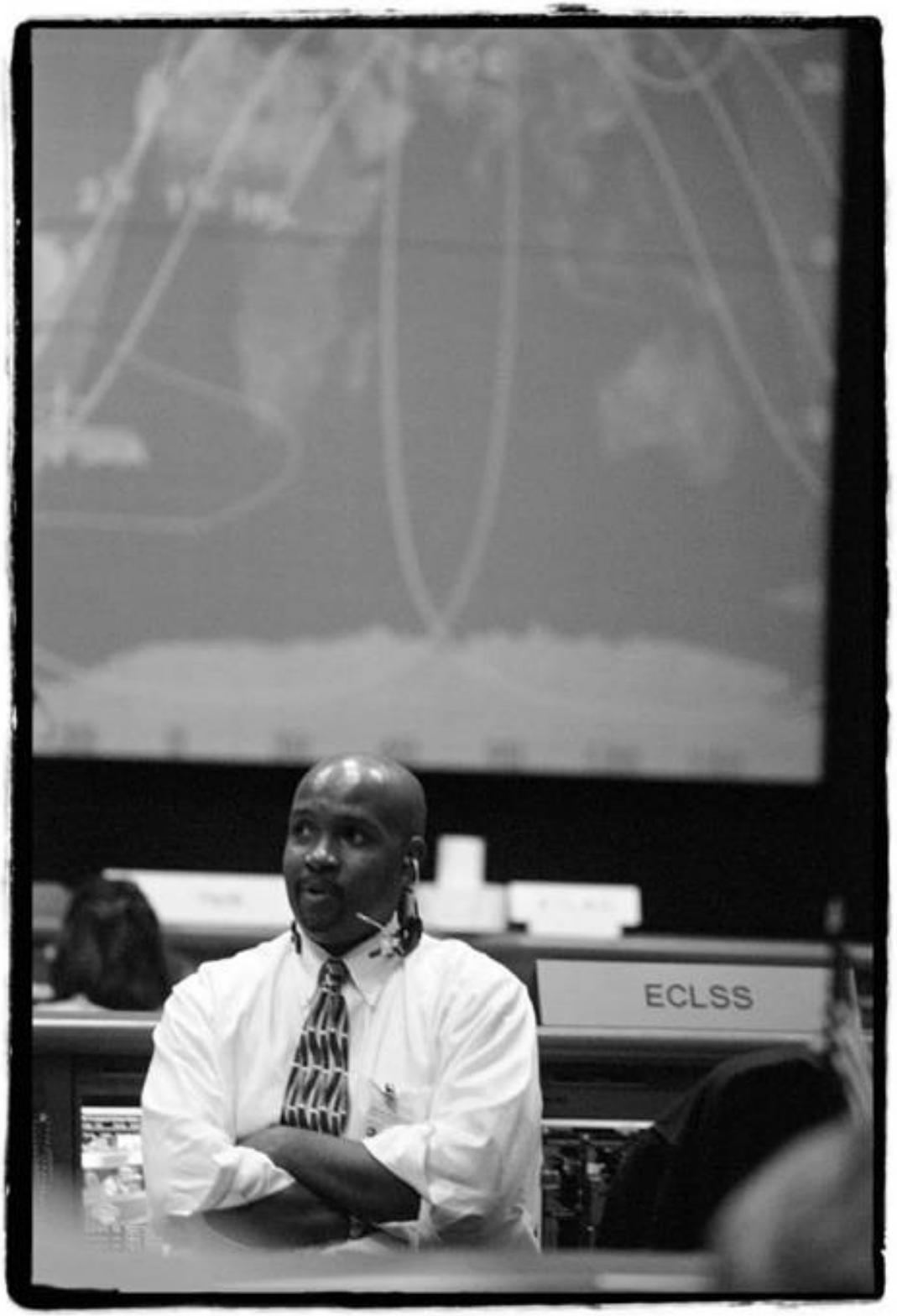

MHP

Learning Orlan

Yuri Gagarin Training Center Star City, Russia
May 2002

Astronauts John Phillips and Ed Lu are learning all about the Russian spacesuit, which is called ORLAN–"Eagle" in Russian. The American and Russian spacesuits are both used by all crewmembers on board the Space Station for extravehicular activities.

Here the ORLAN spacesuit is adorned with a Mir patch, representing the Mir space station on board which Phase I of the International Space Station training was achieved through seven joint Russian-American missions between 1995 and 1998.


ECLSS

Life Support

Johnson Space Center Houston, Texas
Mission Control *Columbia* STS-109.
February 2002

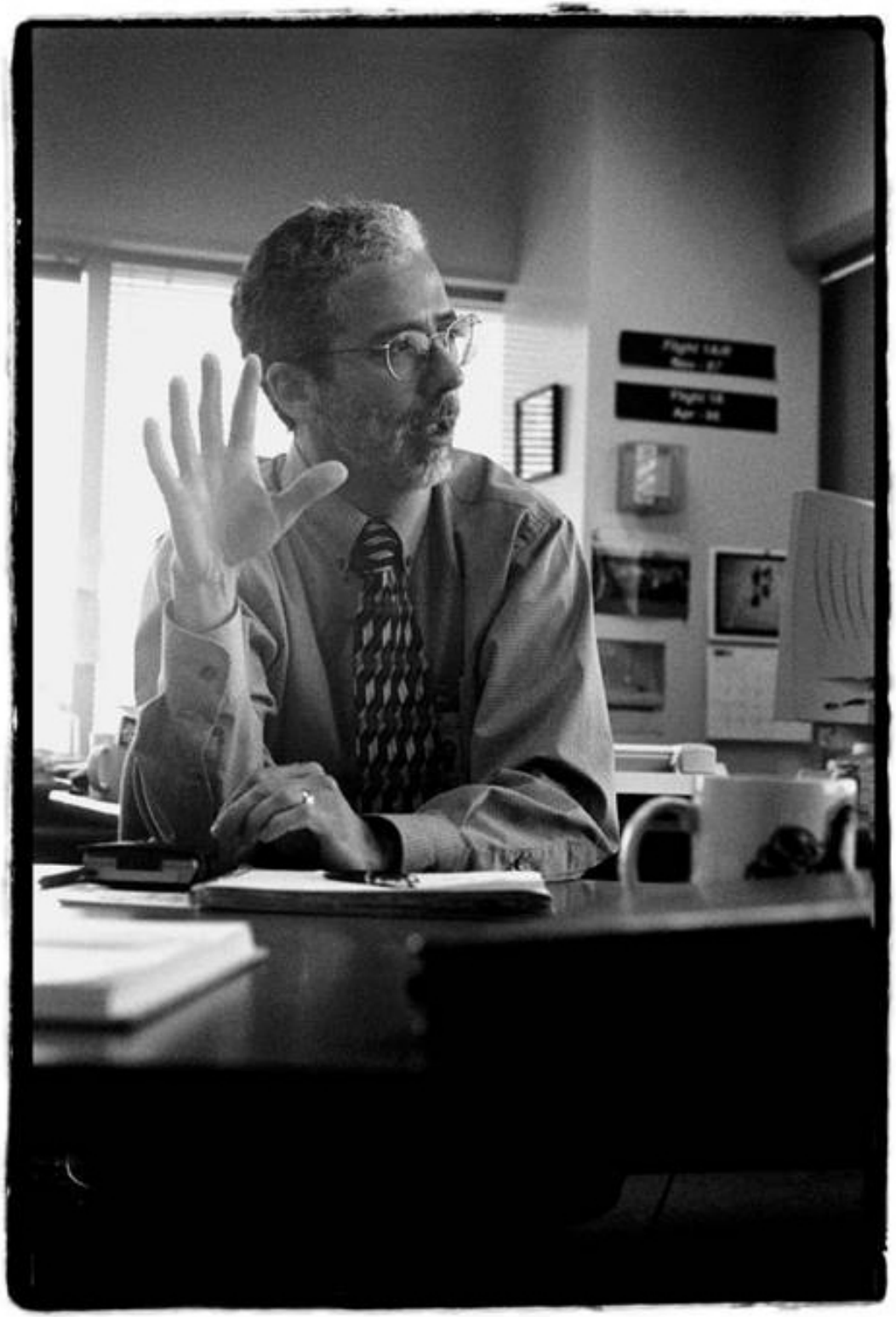
After capturing the Hubble space telescope, *Columbia's* crew is preparing 5 intense and very challenging EVAs (Extravehicular Activities) to rejuvenate the most famous telescope in the world and improve its capability by a factor of 10.

On the ground, at his console dedicated to Environmental Control and Life Support systems, Flight Controller Kwatsi Aliburuho along with his colleagues and the Flight Director are carrying the mission on their shoulders.

With much attention and care, engineers Vuong Pham and James Milhoan are preparing a test in a plasma chamber that will simulate a reentry into the atmosphere for a piece of the shuttle wing. People at NASA, working with dedication and passion, are generally very impressive.

Lights of Passion

Johnson Space Center, Houston, Texas
September 2001



Spending most of his time in meetings, International Space Station Manager Mark Geyer is, as his colleagues do, inventing every day the new way NASA is working and building with 16 international partners a one-of-a-kind space outpost.

In the meantime, Mark has to be a conductor, making sure that in this "big orchestra" of technical, political, diplomatic and financial soloists, even if each instrument is not playing the same note, the music will stay harmonious.

Managing

Johnson Space Center
Houston, Texas
June 2001

Mars Generation

Ellington Field , Houston, Texas
October 2000

His head in the stars, facing the outside light while the crew of STS102 shares with the crowd its first impressions after their landing, this young boy is looking forward.

Capitalizing on the efforts of so many, his generation will hopefully see, people working and living on the Moon and also exploring Mars and beyond.


ASTRONAUTS
МОСКВА
HOUSTON
1999
2000
СОЗВЕЗДИЕ
ИССЛЕДОВАТЕЛЕЙ
КОСМОСА

Roman Ivanovich Yakimenko, Ph.D. from the Russian Space Agency in his office at JSC. The collaboration of the Russian Space Agency and NASA on the ISS project is a source of mutual pride, challenge, and excitement on both sides.

Mockba - Houston

Johnson Space Center, Houston, Texas
June 2001


NASA

Mr. Goodmood

Johnson Space Center
Houston, Texas
April 2001.

Security Officer, Arthur Moody is a JSC icon. One of the first employee of what was the Center for Manned Space Flight in the 60's at that time situated at Ellington field, Mr Moody is definitely the most popular Security Officer on site.

His unfailing good mood, smile and care is legendary.

Orbit on Fingertips

Johnson Space Center, Houston, Texas
November 2000

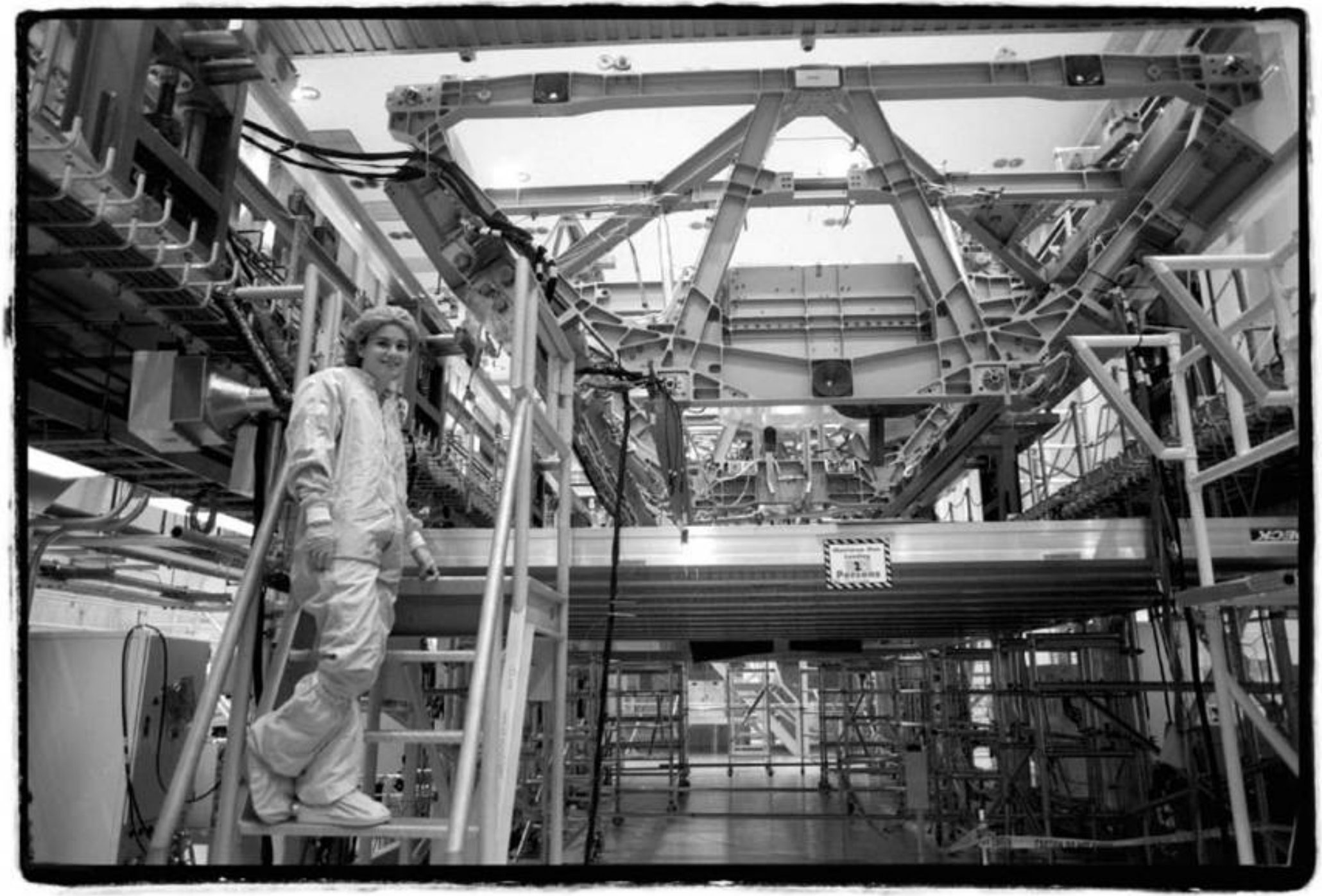
Shuttle Avionics Integration Laboratory (SAIL). Setting a new configuration in the Orbiter OV 95 used to test flight software.

Here, everything is just like in an operational Orbiter, except there is no micro gravity.

This cockpit, roughly the size of two telephone booths, is where the most complex vehicle ever built is controlled.

One would tell you that it feels alive, probably because it is the result of so much human energy, intelligence and work.

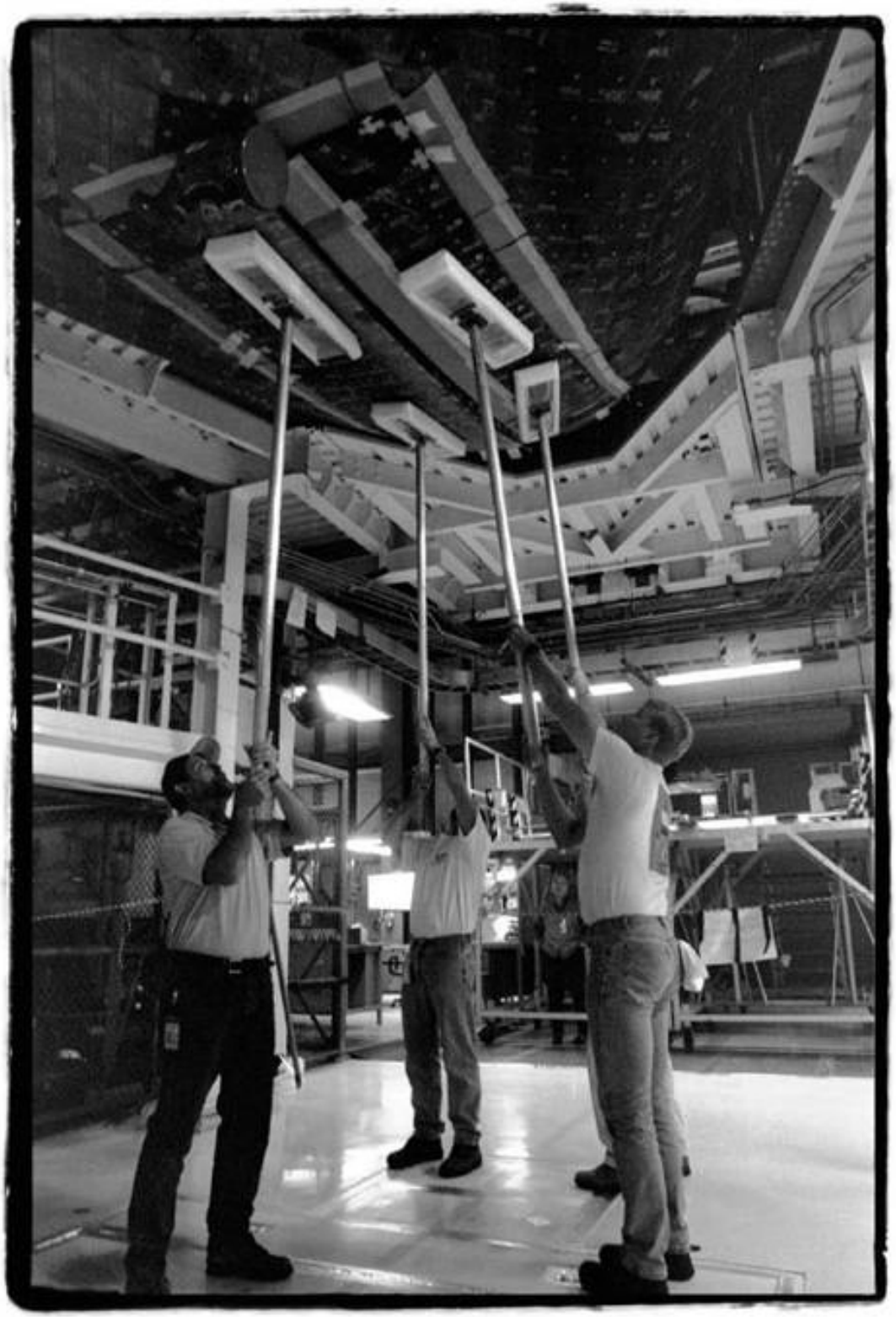
Actually, I do think so.


Maximum Safe Loading
1
Persons

This young Johnson Space Center engineer looks fragile but fully determined beside the cradle shape of an element of the International Space Station. There are 100, 000 people such as her, all over the world, in 16 different countries, involved in what is the most challenging and exciting technological achievement of our lifetime.

Proud and Shy

Kennedy Space Center, Flordia
October 2000

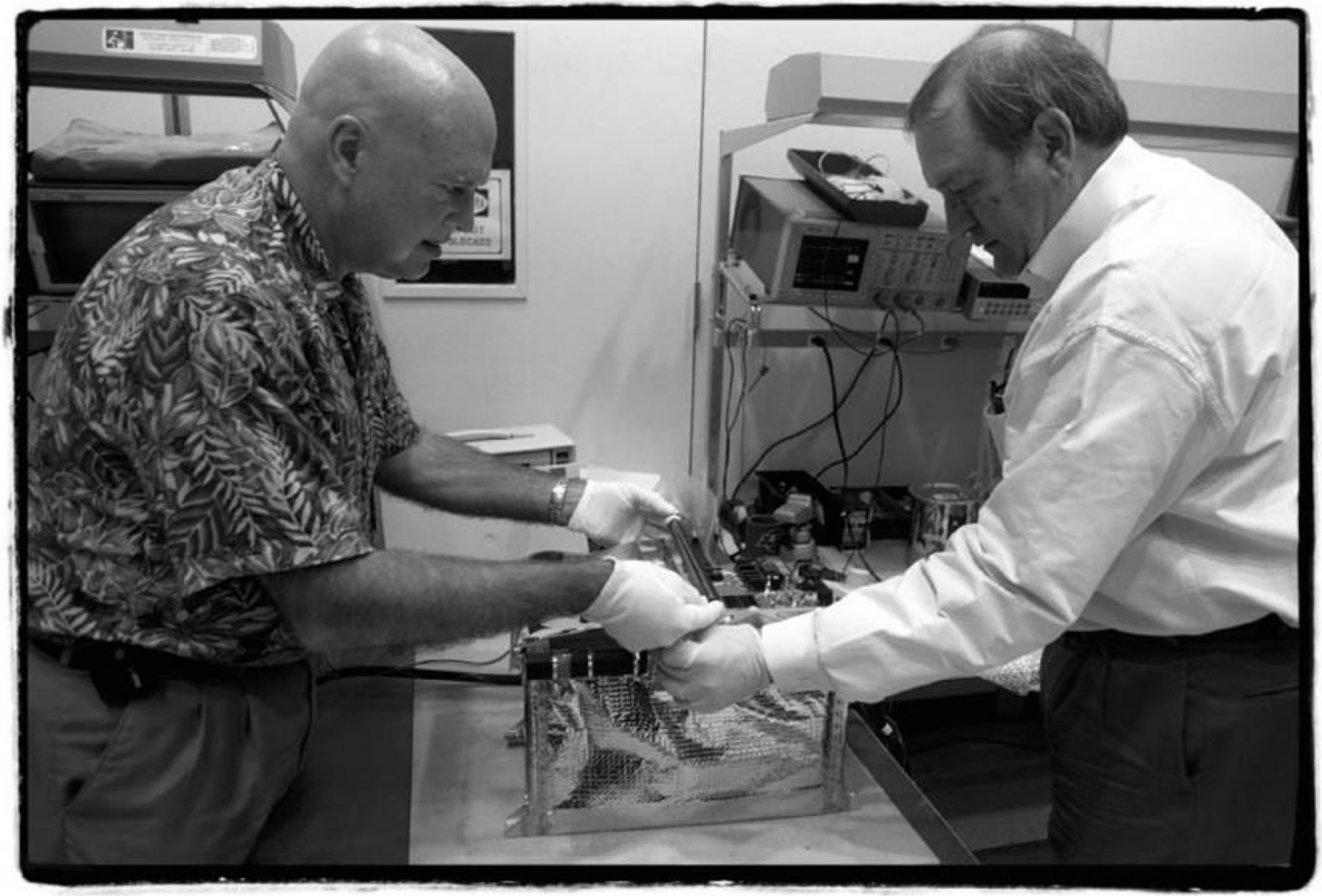


Pushing the Envelope

Kennedy Space Center, Florida
November 2000

If there is a extreme vehicle, it is the Space Shuttle.

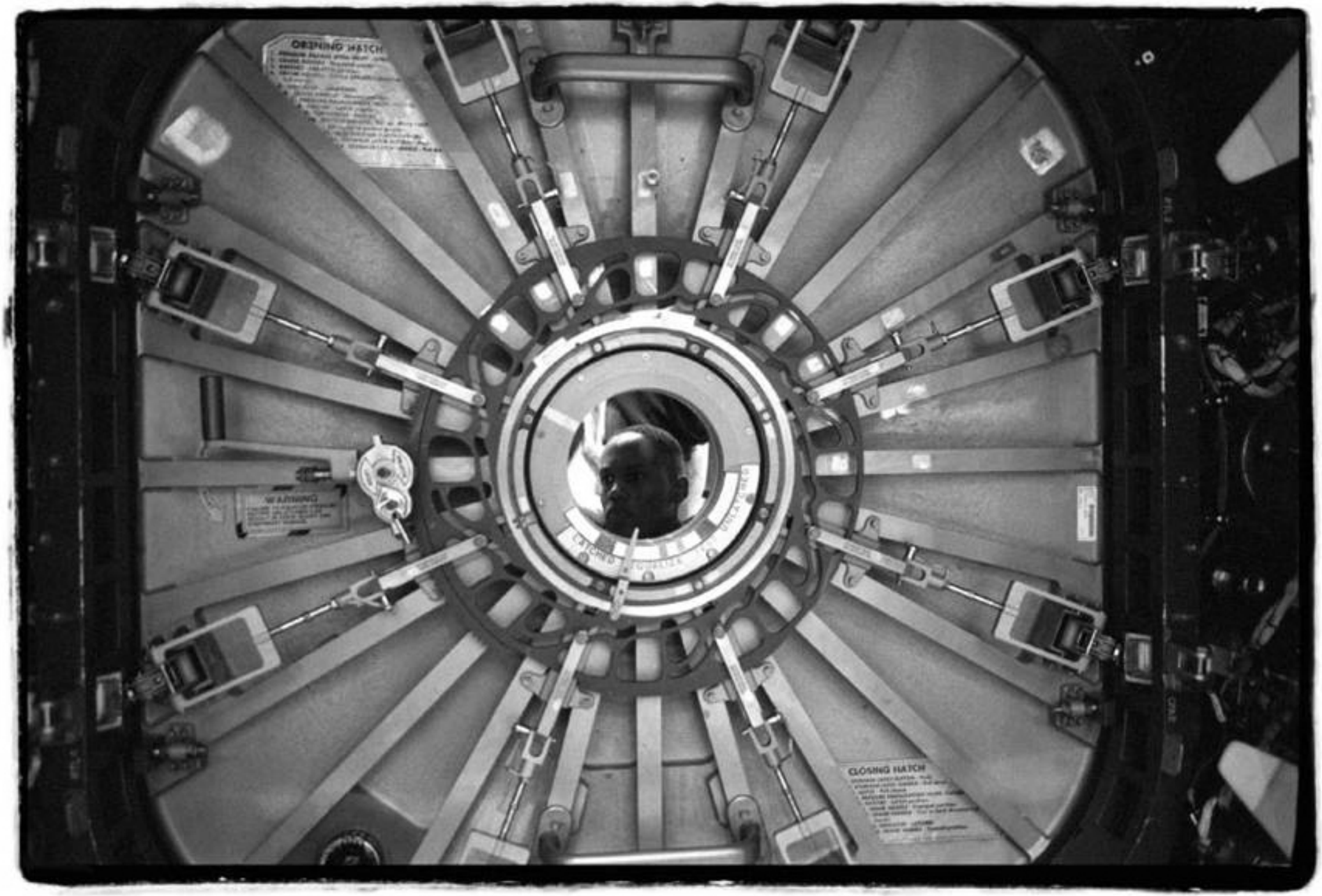
Launched like a rocket, it takes just 8 minutes and 30 seconds to reach orbit. Going from 5 miles per second in orbit to stop safely on its runway will take it a little more than an hour. It lands like a simple 300-ton glider, with no engine to attempt any second approach, after surviving the infernal temperatures of reentry in the atmosphere. In the mean time, it has safely sheltered a seven-member crew during nearly two weeks in orbit and has allowed this crew to live, work, deploy payloads and experiments, dock with the Space Station, retrieve and fix satellites, service the Hubble space telescope... etc...but it nevertheless takes four trained humans with some kind of strange brooms to manually close the Shuttle's main gear doors without damaging one of the 26 000 tiles protecting this unique "bird." Here is one of the four Space Shuttles operated by United Space Alliance for NASA: Space Shuttle *Endeavour*.



With paternal attention, these two engineers are deploying the protective shield of a Mars experiment scheduled for launch in 2003. All members of the team and also JSC's Director, have their signature on the metallic structure of this device.

Ready for Mars

Johnson Space Center, Houston, Texas
September 2000


OPENING HATCH
CLOSING HATCH

Ready to Hatch

Johnson Space Center, Houston, Texas
June 2002

Being selected as a candidate astronaut means that you have won the right to learn and train hard for at least two years.

This long and difficult process is designed to fully prepare astronauts to handle technical assignments as well as missions on board the space shuttle, the International Space Station and beyond. Learning things apparently as simple as opening a hatch is part of the safety training. Focused candidate-astronaut Alvin Drew is shown carefully following the procedure on an International Space Station internal door.

Soon, he will be "ready to hatch" as an astronaut.

Rehearsal

Sonny Carter Neutral Buoyancy Laboratory
Johnson Space Center, Houston Texas
October 2000

Neutral Buoyancy Laboratory. This gigantic pool of wonderfully clear water – where mockups of the shuttle and space station are used to train astronauts for extravehicular activities (EVAs) – is the exclusive domain of very skilled and dedicated divers.

Here we can see the shuttle cargo bay and the two back windows of the cockpit. Amazingly, training for space activities starts here 25 feet under the surface of water.

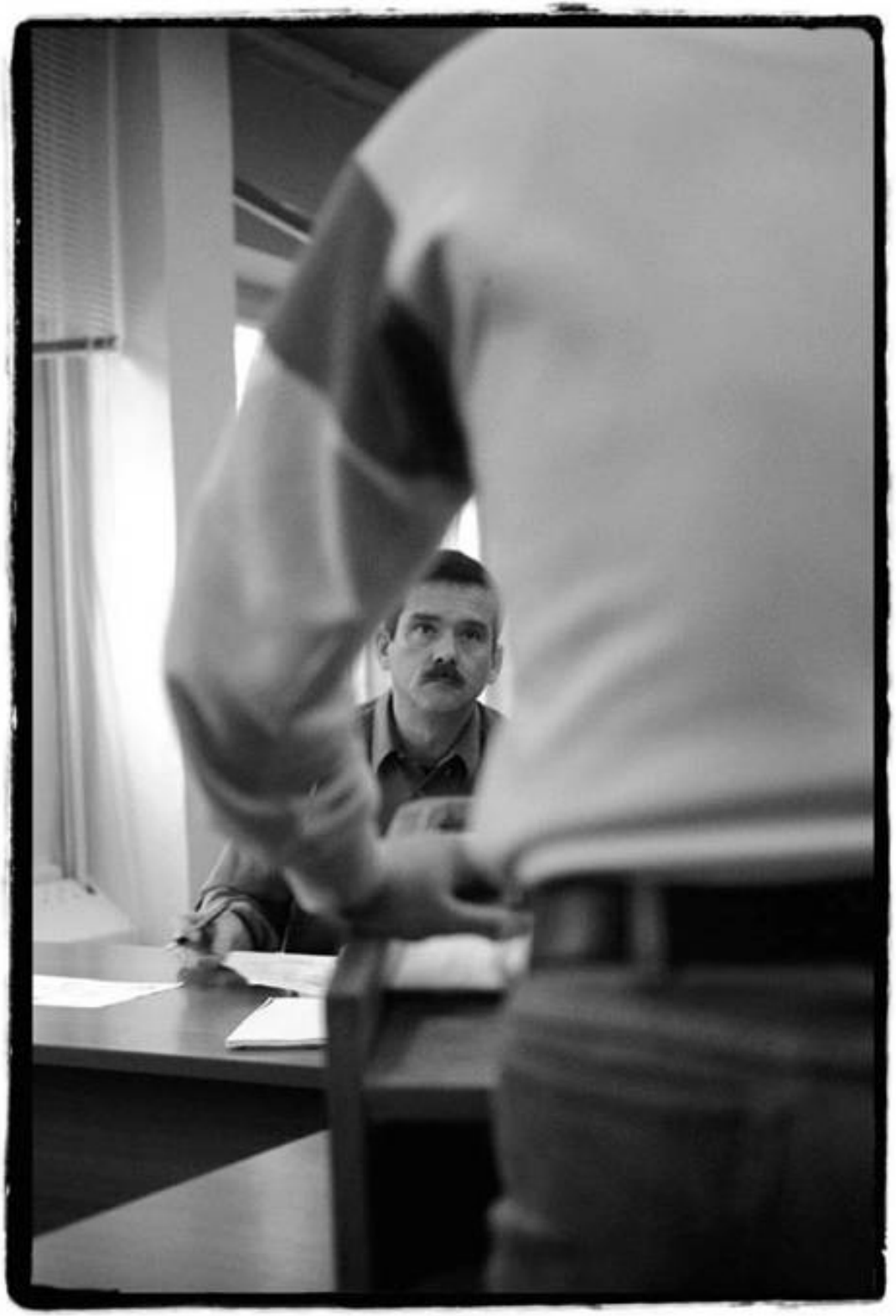
Relics

Johnson Space Center
Photo lab, Houston, Texas
February 2003

A terribly tormented debris of what used to be one of the cameras of *Columbia's* crew made its way from East Texas to JSC photo lab for documentation and identification.

With much care and emotion, Mark Sowa will take pictures of the debris.

This makes them some of the most extraordinary pictures ever, considering the catastrophic events they survived.



School Days

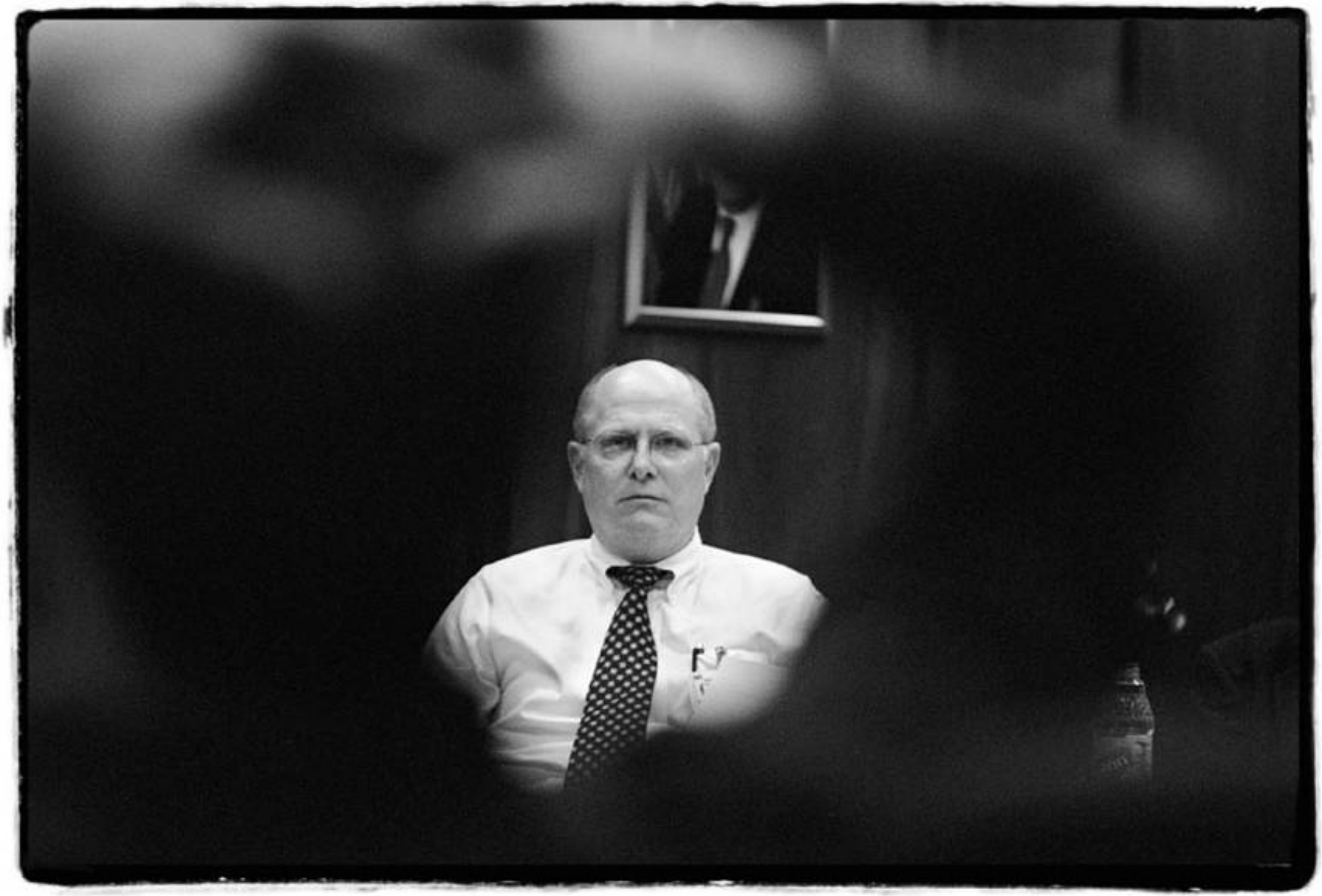
Yuri Gagarin Training Center Star City, Russia.
April 12th 2002

One of the main differences between the Russian training system and the American training system is that individual classes are given by highly skilled trainers in a very traditional, but very efficient way on the Russian side, and that a lot of simulators are used for small groups of astronauts on the American side.

Both training systems have proved effective, and the mixed training of astronauts and cosmonauts in Star City and Johnson Space Center is a very interesting experience for all.

Canadian Astronaut Chris Hadfield is focused, dedicated and hard working as he is shown here with his instructor in the Soyuz communication system class.

Maybe an inspiration for some students...



Randy Stone, JSC Deputy Director during a meeting with members of the *Columbia* Task Force.

Seeing It to the End

Johnson Space Center, Houston, Texas
March 2003

For the audience welcoming the STS-100 crew, Astronaut John Philips tries to find words to describe his experience.

Sharing the dream might be one of the most challenging part of a mission, and one of the most important too.

Sharing the Dream

Ellington Field , Houston, Texas
May 2001

Space Craft Surgery

Johnson Space Center Houston, Texas
Motion Based Space Shuttle Simulator
June 2002

Richard Rocha is practicing some "artery surgery" on the hydraulic system powering one of the legs of the Motion Based Space Shuttle Simulator which needs to be replaced. The operation will last about 5 hours and require the efforts and expertise of 3"surgeons."

This simulator is key for training the Shuttle crews, especially the pilot and commander.


GM

The most amazing expertise of NASA people is often behind the scene.

Who knew that the spacesuit cap protecting the astronaut's helmet during Extravehicular Activities (EVAs) had been designed and made with a sewing machine by golden fingers?

Space Quilting

Johnson Space Center
Houston, Texas
November 2000

Launch of STS-106. They are seven astronauts and cosmonauts atop of that little light on the column of smoke.

A launch is a physical and an emotional experience that cannot be actually shared or explained. At this very moment, even cameras have tears in their eyes.

Stars & Pride

Johnson Space Center
Houston, Texas
September 2001

The Fear Factor

Yuri Gagarin Training Center
Star City, Russia
May 2002

NASA Flight Director Joel Montalbano seems to be bravely defying a gigantic and impressive monster – the large-scale, famous centrifuge at the Gagarin Training Center.

The Russian centrifuge is able to re-create on the human body any gravity up to over 30 Gs. Its cabin equipment can spin on 365 degrees in two axes while turning full speed on its enormous arm.

The Gagarin Training Center centrifuge is used to train the Russian cosmonauts.

Tightrope Walker

Johnson Space Center
Houston, Texas Mission Control

At the EVA console (Extravehicular Activity) in the ISS Flight Control Room in Mission Control Center Thomas Gonzales Torres concentrates on the progress of an EVA preparation for 2 crewmembers on the International Space Station.

Even if in a few years EVA went from a "contingency status" to a regular activity, nearly considered a "routine," it is still one of the most challenging moments for a crew and certainly the most dangerous, beside ascent and re-entry.


Space Station...A New Star on the Human Sky Next

To Be an ISS Manager

Johnson Space Center
Houston, Texas
September 2001

A day with ISS Manager
ED CASTRO.

To be an ISS manager is an exciting and very demanding job. Following Ed Castro during a typical day, it is easy to realize how much stress and pressure is put on one man's shoulders.

On the menu,what it takes to design, built, finance, test, ship... the new galley for the International Space Station and a visit of the ISS full-scale mockups with students.


MAC
STS-109
STS-103
STS-82
STS-61
STS-31
NBL

Tool Time

Johnson Space Center
Houston, Texas
March 2002

Except for the medical doctors and their families, the astronauts only talk to the CAPCOM console – which is manned by an astronaut who is their only interface in Mission Control with the rest of the people on the ground. In exceptional circumstances, however, the astronauts can speak directly to somebody else.

At the end of the STS-109 mission in March 2002, the crew insisted on talking to Ron Sheffield – the man who, since the first Hubble mission, designed for the astronauts the tools used to service the famous space telescope. The day the crew of Colombia released Hubble from the shuttle cargo bay after five days of consecutive, very successful but very challenging extravehicular activities, Ron received a very special call.

Visibly moved, Ron is listening at this moment to astronaut Mike Massimino, who is expressing gratitude to Ron for the job he has performed and for his long-term commitment to Hubble, trying to convince him not to retire by arguing that NASA will need his incredible expertise for the next servicing mission to Hubble in 2004.

Working the Jigsaw

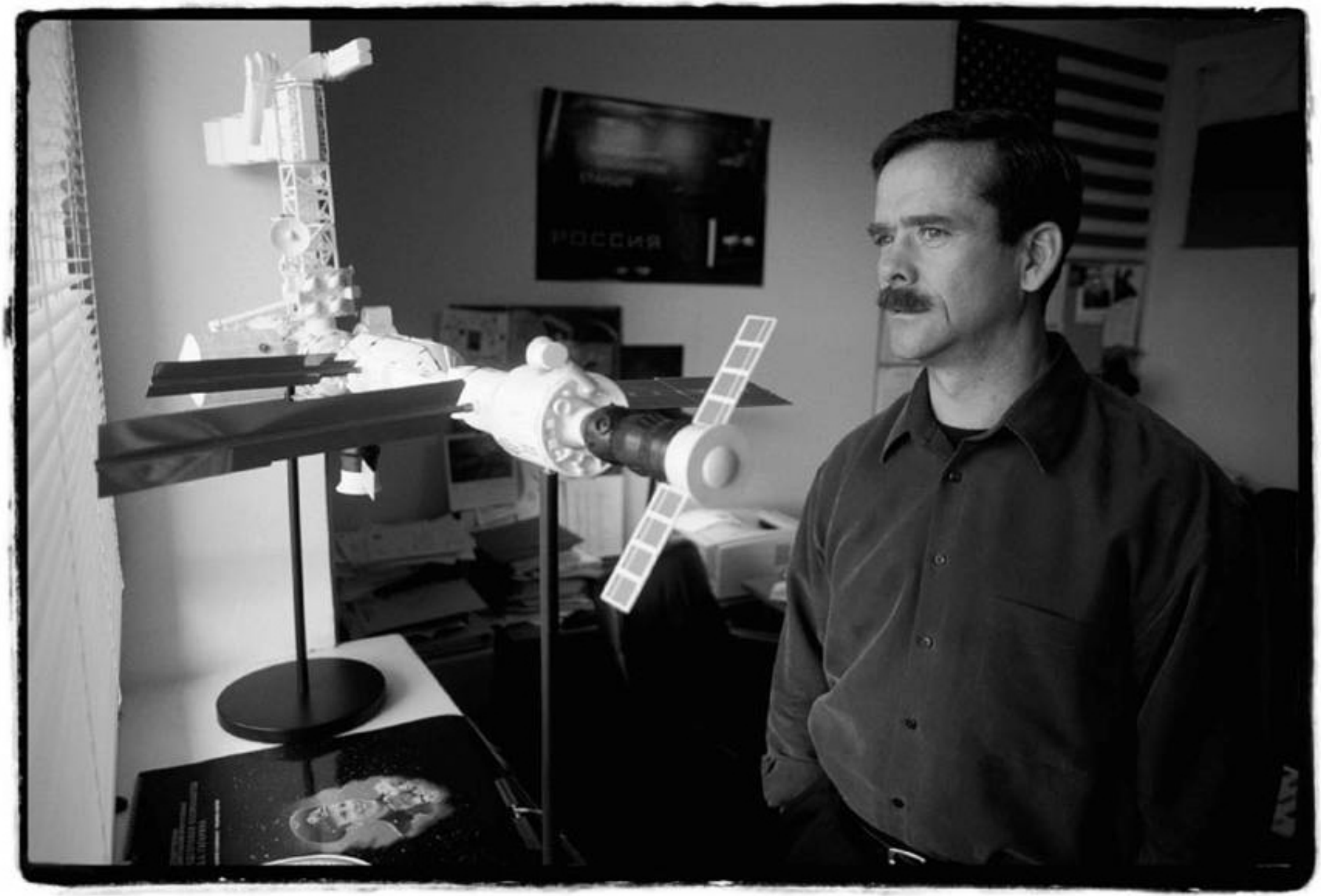
Kennedy Space Center, Florida
Hangar J6-2466
March 2003

The hangar where the Shuttles are first sheltered after their landing is used to collect, identify and reconstitute what is left of *Columbia*.

Among the key elements, the RCC panels (Reinforced Carbon-Carbon) are the object of special attention.

A gigantic sobering and frustrating jigsaw is the environment of dozens of engineers and technicians, patiently trying to make the best out of what the searchers on the field sent them.

Here, Dr. Lisa Huddleston, Engineer with Spherion Corporation, is trying to find a match for a piece of RCC panel.


РОССИЯ

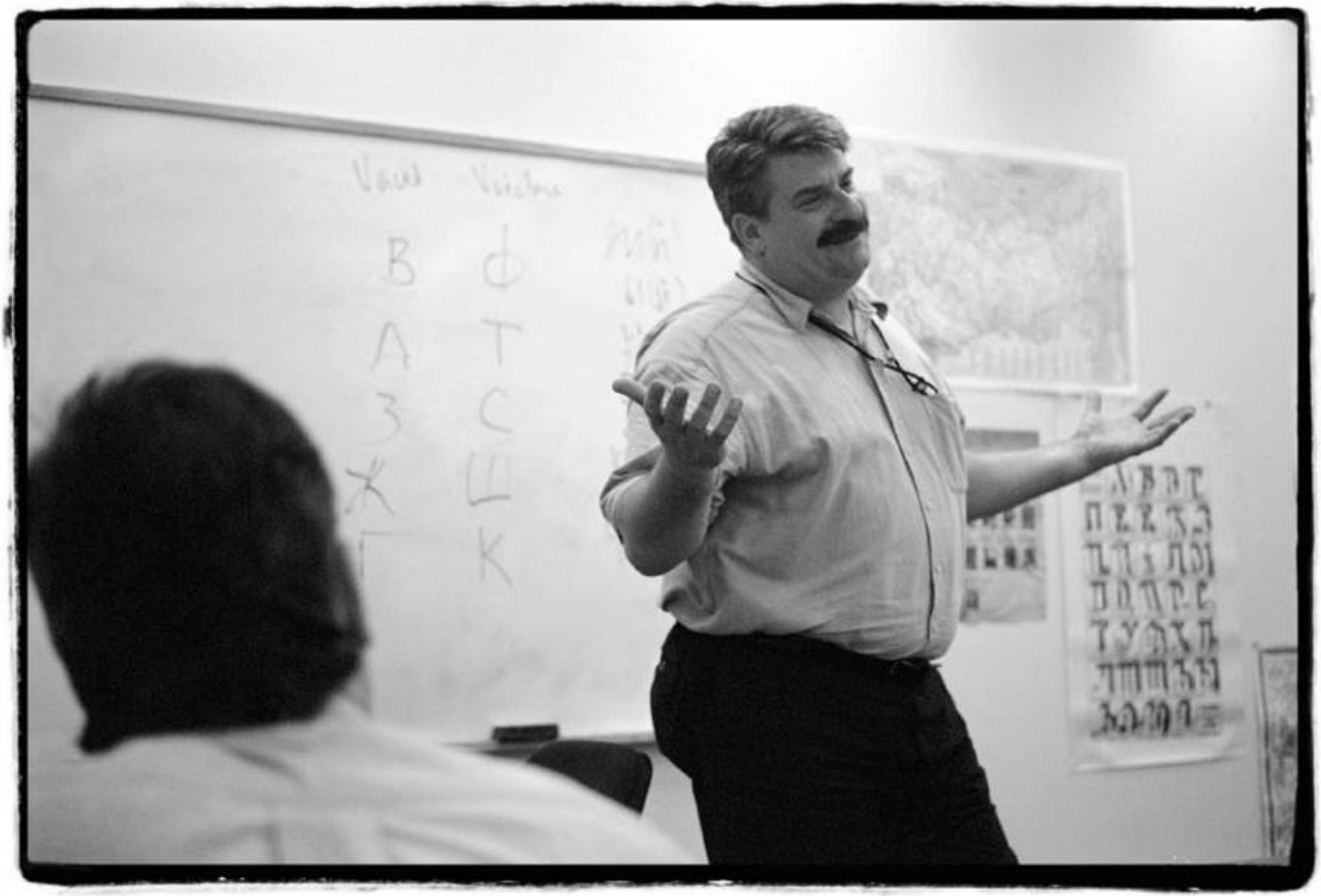
Yuri's Spirit

Yuri Gagarin Training Center Star City, Russia
April 12th 2002

A veteran of two missions, including one on the Space Station Mir and one on the International Space Station Alpha, Canadian Astronaut Chris Hadfield, pictured here in his office, is supervising the training of NASA astronauts in Russia. Forty-one years ago on this day, Yuri Gagarin became the first human being to go to space.

Although it began a few years ago, Yuri's Day has been celebrated all over the planet by more and more people as the symbol of the space exploration humankind has to carry on in the spirit of collaboration exemplified by the International Space Station.

When Chris was asked what could be done to improve the space collaboration between Houston and Star City (situated a few miles north of Moscow), he said, "Just get rid of the nine hours' difference between us!"


Vowels
Voiceless
В
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К

Zdravstvooytye

Johnson Space Center, Houston, Texas
May 2002

ZDRAVSTVOOYTYE (phonetic translation) means "Hello" in Russian. More and more NASA people are taking Russian language classes since the Russian Space Agency is a major partner of the International Space Station. Here, Tony Vanchu, one of the talented Russian instructors at the Johnson Space Center, is teaching a first-level class with much enthusiasm and humor.

Learning the language of the space station's different partners is key to the development of cooperation and mutual understanding for partners in the space station. By learning the languages of partner nations, NASA people build strong, direct, durable and personal relations that constitute the basis of fruitful relations–on the ground as well as in space. These relations have dramatically improved in the last 10 years and are getting better every day.

Stars Gate

Johnson Space Center Houston, Texas
Space Environment Simulation Laboratory
June 2002

JSC Photographer James Blair is making a last picture of the ESA Mars project Beagle 2 airbag landing system being tested in the world's biggest vacuum chamber designed for the Apollo program and used until today before the door closes.

From technical high-speed photography to documentation of historical moments of the space program, the NASA photographers at JSC and all over the other NASA centers are published all over the world in the most prestigious publications. Unfortunately, and for some obscure reason, their names are never mentioned.


TEAM NASA

Team NASA

Johnson Space Center
Houston, Texas
October 2000

Preparation of the Inspection 2000 reception under the Space Shuttle mockup. Inspection Day is an opportunity for business to explore possible benefits from the Space Program. Hundreds of NASA people are mobilized, from laboratories to kitchens.

Is this cup's design a spin off of the Shuttle Main Engine?

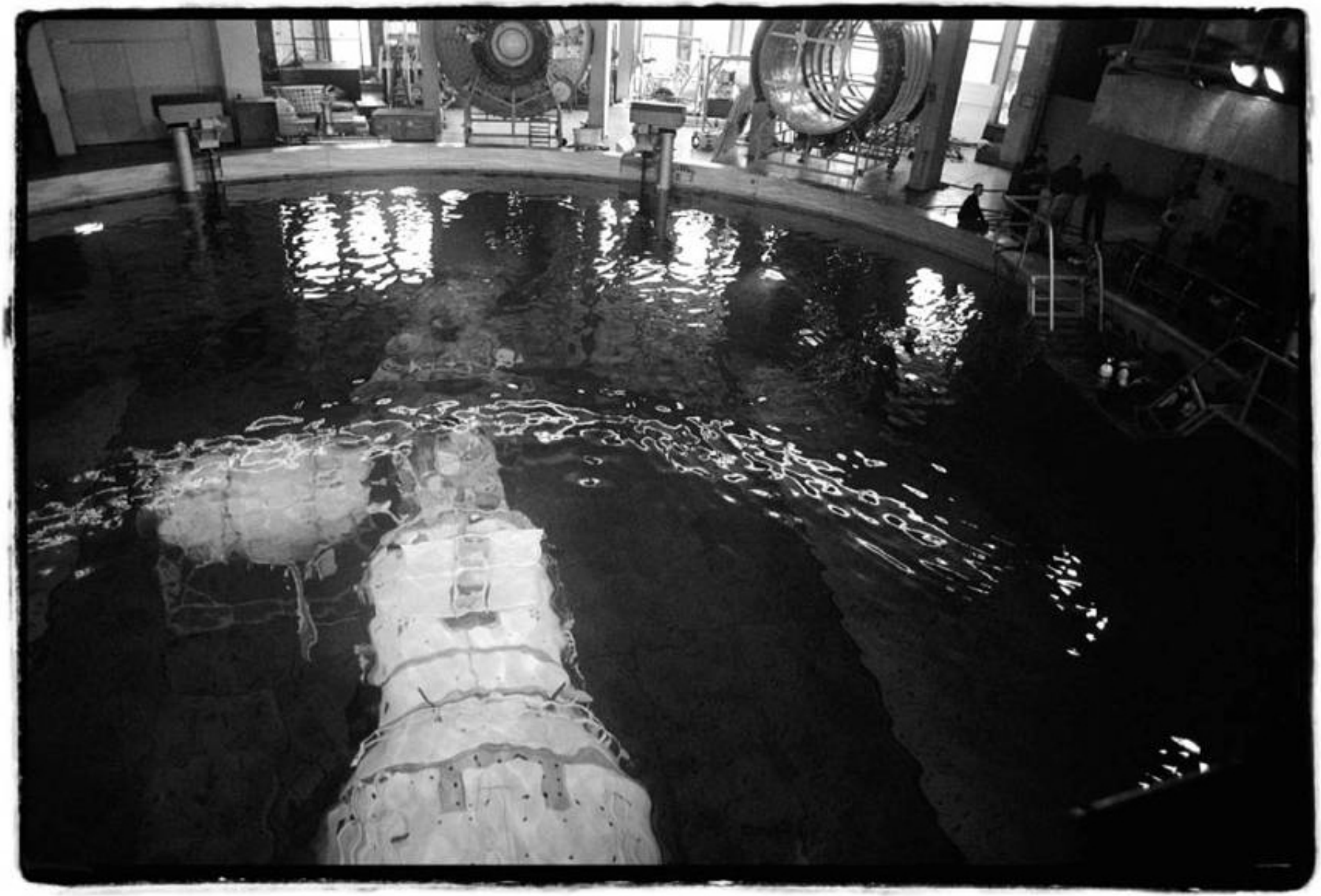
Space Fabrics

Johnson Space Center, Houston, Texas
April 2001

Nobody travels to space without luggage. Making the luggage for the International Space Station missions is a precise and delicate task, where fashion is far removed from specifications.

The workshop is very busy, custom-making – under strict requirements of all sorts – the luggage for tons of equipment, devices, supplies and tools needed to support the space station.

Astronauts must like white!



Water Space World

Yuri Gagarin Training Center Star City, Russia
May 2002

As on the American side, the extravehicular activities training of Russian cosmonauts is made in a pool where mockups of the space station are installed on a very clever elevator-floor system that is able to rise and descend in the water to the desired depth.

Round in shape and smaller than the famous Neutral Buoyancy Laboratory at the Johnson Space Center, the Russian pool uses the same principle as the American pool – even if the Russian space-suits are different.

The Zvezda module (crew quarters on board the space station) and Pirs (the Russian airlock) are clearly visible underwater.

With time we have learned that in space nothing could replace human eyes.

Geologist Pat Dickerson and geomorphologist Justin Wilkinson from NASA Earth Observation Laboratory discover with STS-100 crewmembers Mark Polansky and Bob Curbeam their remarkable pictures.

Space Treasures

Johnson Space Center
Houston, Texas
May 2001

Support Team

Johnson Space Center
Houston, Texas
October 2000

Neutral Buoyancy Laboratory. After eight hours of hard training in water, this astronaut needs the help of divers and technicians to exit the pool and his space suit.

Though it often looks easy – thanks to the talented people of NASA and the many hours of practice and preparation – space is also about sweat. No one person can claim an individual success is not also owed to others.