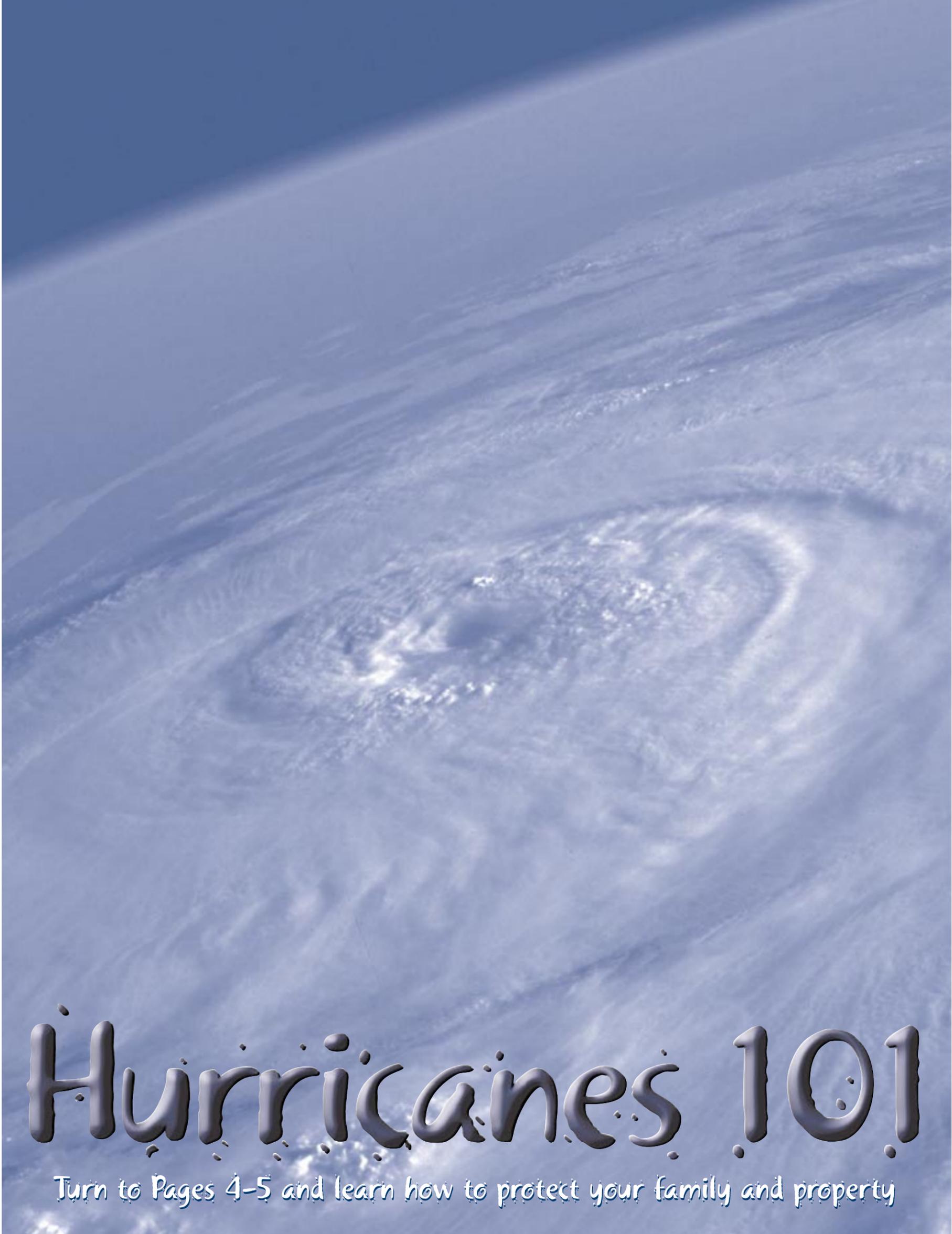




SPACE CENTER Roundup

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Hurricanes 101

Turn to Pages 4-5 and learn how to protect your family and property

NASA JSC STS51I-44-0052

It's hurricane season from now until the end of November. Pictured here is Hurricane Elena. With wind speeds in excess of 110 miles per hour, the hurricane was photographed in the Gulf of Mexico on September 1, 1985. Almost the entire storm can be seen in this photograph. For instance, a number of thunderstorms with their overshooting tops, the spiral bands of numerous thunderstorms leading to the eye of the hurricane and numerous cloud gravity waves within the spiral bands can be seen. Some portions of the eye wall, where the most destructive winds of the storm occur, are also visible. This storm eventually made landfall near Gulfport, Miss. This image, and many other fascinating views from space, can be found at <http://earth.jsc.nasa.gov>.

ISS: Learning for the future

Tommy Holloway, ISS Program Manager



The Apollo yesteryears are gone, and the “Yuri” generation of space enthusiasts (those born post 1961) seems a bit restless and dismayed. Yet, as people working on the International Space Station know, these are revolutionary times. We are learning so much. The challenges, accomplishments and sense of internal achievement is every bit as exciting as “the good ol’ days.”

There is a real story besides what’s in the news. It’s about men and women reaching for technical achievement, struggling through management challenges and learning from each other while working through these issues each day.

The future is now and it is exciting! We’ve flown 23 missions in the last 22 months – from the July 2000 Service Module launch to Soyuz 4 in April 2002. The Station is in control and flying marvelously in orbit. The success is unprecedented. While the ISS has its daily problems, each one of them is being resolved.

As the world gets a growing glimpse of the new object darting across the night skies, the ISS Station Team wakes up in Houston, Huntsville, Cape Canaveral, California, Moscow, Montreal, Paris, Noordwijk, Tskuba, Tokoyo, Baikonur, etc., ready to face another day filled with new opportunities and challenges.

On top of that, some new requirements usually are levied on their workday. Perhaps those requirements are due to the expected or unexpected technical, operational and safety issues that arise from a one-of-a-kind engineering and integration program operating 240 miles above the Earth. Or, they might be due to any number of international, management and, increasingly, business and financial issues that pour out of the ISS “job jars” on a regular basis.

I am often asked, “Why do we have a Space Station? In fact, why are we still spending billions of dollars on NASA and its programs?”

For me the answer is simple: It is because few other enterprises funded by the American taxpayer have delivered such extraordinary benefits, while enabling leadership among nations and peoples of the world.

We also have a quintessential urge to explore – to penetrate the unknown, to find out what’s on the other side of the mountain. Our motives are as diverse as our backgrounds, but we are bound by this common desire.

No single purpose, person or nation created the architecture and partnership for the ISS. It represents an evolutionary step for the human spaceflight experience in four areas:

- ❖ Scientific potential enhancement
- ❖ Engineering integration
- ❖ Business and cultural management
- ❖ Operational philosophy

We’ve now set our sights to become as excellent in the management, business and finance of human spaceflight as we are in its technical and operational execution. We have a “no-kidding” credibility gap that needs to be restored concerning ISS budget and management. This restoration will be accomplished by achieving the U.S. Core Complete phase through the flight of Node 2 in February 2004 – on budget and on time. We will succeed in building multiple pathways for future human space exploration with each step we make “up the mountain.”

The ISS program does the following for leadership in spaceflight:

We provide the spacecraft

We have an unprecedented operating international research lab – fully staffed – that is growing in science, exploration and engineering capabilities.

We provide people

Our people are the most important resource of all. They, by virtue of their involvement in building the ISS, have had to face, learn and move through issues each day on every end of the human spaceflight spectrum!

We have a strong tradition and core values

Our work is founded on the tears, sweat and soul of many who came before us, and many that will yet come. Our commitment to safety, technical excellence, integrity and trust, which goes hand-in-hand with respect for one another, is the engine and glue that gives us power, keeps us together and moves us forward.

We have developed a respect that emerges from diverse motivations but is united in common purpose. It’s a respect that at times has been forced but mostly flows from a spirit of cooperation. The best attribute of our tough and fragile partnership is our ability to endure as we continue to learn. We recognize our diversity as our strength and our commitment to core values as the propulsive force. These ingredients are the basis of our learning organization and our ability to thrive in the future.

So what can we all do to support this?

- ❖ Maintain safety first and foremost.
- ❖ Continue to execute the program in the same outstanding manner.
- ❖ Maintain schedules! We are anchoring on the milestone of Node 2 in February 2004.
- ❖ Support the management and cost reduction initiatives with the same vigor and excellence that we have demonstrated in executing the technical aspects of the program.
- ❖ Recognize and support the evolution of the ISS Program to a high performance organization.

NASA offers a future for the explorers of the 21st Century. Our mission is a journey of hope, promise and discovery. I believe this spirit of exploration lives on in a new generation of Americans and youth worldwide. Their generation has enormous reservoirs of knowledge and power at their fingertips.

We owe them more opportunities to discover their talents, to expand and nourish their dreams, and to find their destiny. We can step up and deliver. We have the great privilege to play a part in discovering new worlds, as well as to experience the joy and fulfillment of helping make our own world a better place. That climb is well worthwhile! ❖



Two months and running!

FROM THE DESK OF LT. GEN. JEFFERSON D. HOWELL, JR.

I’ve been here two months now, and I’m still drinking from a fire hose! Every day I learn a lot more, and every day I realize how little I know about this wonderful place. However, one theme consistently comes through in every briefing or meeting I attend and every place I visit: Johnson Space Center is staffed at all levels with exceptionally talented and dedicated people. If we work as a team and everyone gives his or her very best, we will continue to experience the same success that this Center has enjoyed in the past.

Things ARE changing! Our Administrator is bringing in a new team at Headquarters and taking a new approach to our vision and mission. We are changing here, too. Our relationship with the major human spaceflight programs will be more as a partner and supporter than as their “boss.” I am altering some portions of our Center organization to gear it better for our new role and for future activities.

Change in any organization can induce uneasiness and even fear in many of its members. This can lead to wild rumors and forecasts of all sorts of awful outcomes that are distracting and counterproductive. We can’t let this happen at JSC!

Our mission is too important. The lives of our astronauts are too precious for us to allow ourselves to lose our focus on our duties. Keep in mind that we will continue to assemble the International Space Station, as well as conduct scientific research on it. The shuttle will continue to fly in support of it.

We are a vital part of both of these missions and will continue to be so for many years to come. We will also be a vital part of the future human space programs that follow. JSC will remain the “go to” center for these types of endeavors.

You are on a great team that will only get better in the days ahead. Keep the faith! Stay focused!

IT’S GREAT TO BE ALIVE AND IN HOUSTON!!!

Celebrate American Heritage Day!

All JSC civil servants and contractors are invited to celebrate American Heritage Day on June 26. Sponsored by the Equal Opportunity Programs Office, this year’s event will honor the men and women of our military, law enforcement and fire departments.

An exhibit for these heroes will be displayed in the Teague Auditorium lobby June 24-26, with festivities taking place on June 26 from 11 a.m. to 1 p.m. In addition to the exhibit, the event will include guest speakers and free food.

Come celebrate our shared American Heritage!

The Habitability and Human Factors Office works to answer tough questions

How do you make a space station user-friendly? That's just one of the many questions tackled by the Habitability and Human Factors Office (HHFO), which is part of the Space and Life Sciences Directorate.

In their work, HHFO team members explore many topics, such as:

- ◆ Where should the foot restraints be in the International Space Station to ensure easy access to work stations?
- ◆ Will an astronaut's spacesuit still fit in microgravity?
- ◆ How can the shuttle's computer and warning systems be made more efficient?

Overcoming the limitations of humans in space is the overall goal of the team, which strives to improve the systems that help astronauts live

and work in space. Doing this increases the astronauts' productivity.

HHFO team members support both the space shuttle and ISS programs. In many cases, they do not design items for use in space. Instead, they use research data and feedback from astronauts to improve existing items. For example, the team itself doesn't make spacesuits, but it does help engineers test and critique their design to maximize astronauts' range of motion and strength.

Numerous tools are used to answer many questions. Some of the most useful tools are the team's four research and testing facilities, which are profiled here. Read on to discover how the Habitability and Human Factors Office makes space a better place to live and work.

Usability Testing and Analysis Facility (UTAF)

Overview

The UTAF collects data on the usability of various systems, such as computer interfaces. Astronauts and other system testers use the materials in the facility's subject room while being observed and videotaped from the control room.

Projects

While many systems onboard the ISS are now computerized, they don't all work the same way because several different user interfaces are currently onboard. Astronauts have often said that the differences between the computer systems make them harder to use, so the UTAF collects data on the usability of various systems in order to correct the situation.

The UTAF is also conducting a three-year study on multipurpose crew restraints for the ISS. Hand and foot restraints are more complicated than they might appear. For instance, to use the same workstation, astronauts may need restraints in different places to accommodate their different sizes, or astronauts may be working on the floor one minute and on the ceiling the next, requiring several different restraints. UTAF's goal is to design a multipurpose restraint that could be easily moved to accommodate different people or projects, while still providing sturdy support to the astronauts.



NASA JSC 2002e08132 Photo by James Blair

Mihriban Whitmore, Ph.D., Usability Testing and Analysis Facility Manager, assesses a computer display's user interface for a payload operation. Also shown from front to back are Dan Carr, Ph.D., Vicky Byrne and Rosie Ortiz, all of Johnson Engineering.



NASA JSC 2002e08134 Photo by James Blair

Johnson Engineering's Maitri Dhutia performs a rack push force test in the Anthropometry and Biomechanics Facility. Also shown is Johnson Engineering's Javier Gonzalez, Ph.D.

One UTAF project that is still in the early stages is nicknamed "Magic Windows." This technology would display Earth scenery, photographs or even television footage onto flat-panel displays, giving astronauts an artificial change of scenery. While the natural scenery from space is breathtaking enough, astronauts on particularly long missions may benefit psychologically from a visual change. Magic Windows may even allow astronauts to interact with their families on Earth in a videoconference.

Anthropometry and Biomechanics Facility (ABF)

Overview

The ABF uses state-of-the-art strength measurement devices to assess the physical capabilities of astronauts, both suited and unsuited. The facility does research in biomechanics and ergonomics to maximize the usefulness of spacesuits, and tests suits in the KC-135, Neutral Buoyancy Lab and at remote sites in Arizona and California.

Projects

The ABF takes measurements of every astronaut in several ways. First, the astronaut's size and stature are measured

with a tape measure. Then, strength measurements are taken. Finally, the entire body is scanned so that a 3-D computer image can be created. These measurements are used to select the correct size of spacesuit parts for the astronaut. Averages of the data are also used by the Graphics Research and Analysis Facility to run animated trials of mission procedures.

The ABF team members help evaluate the existing spacesuit designs in an effort to maximize the astronauts' range of motion and strength in orbit. Other projects include analysis of space hardware and crew training on Hubble Space Telescope repair missions.

Graphics Research and Analysis Facility (GRAF)

Overview

GRAF uses high-performance computer graphics programs to model and animate potential mission scenarios before launch, checking for logistical difficulties before they actually occur in space.

Projects

The computer systems in the GRAF can place a 3-D animated astronaut (based on measurement data from the ABF) in an animated shuttle or ISS module and simulate mission operations. Using data from the Light Environment Testing Facility (see below), these models can simulate light availability from various sources, such as sunlight, earthshine, reflections and glares from spacecraft. Doing so indicates whether or not the light will be sufficient to perform a mission objective.

Onboard camera views can be predicted before the mission, and allow the GRAF team members to predict potential payload problems before they occur. Even mission operations, such as ISS component attachments and spacewalks, can be simulated on the computer, allowing for contingency plans if needed.

One of GRAF's success stories came in the early days of the shuttle

program, when engineers were faced with a challenge: If the payload bay doors didn't close, the shuttle would not be able to safely re-enter the atmosphere. However, if an astronaut performed a space walk to close the doors manually, he or she would then be stuck outside the shuttle, as the airlock is located in the payload bay. The GRAF team ran through the scenario graphically until a solution was reached.

Currently, GRAF is focusing on interior volume control for the ISS, helping to maximize working and living space while allowing for arriving payloads.

Light Environment Testing Facility (LETF)

Overview

LETF uses light sources, luminance meters, colormeters, computer models and other tools to predict and analyze the lighting availability in space mission situations. This data helps the GRAF run accurate test scenarios with its computer graphics systems and train astronauts on how to best utilize light during their missions.

Projects

Lighting plays a large part in human space missions. The people onboard must be able to see their computer workstations, scientific experiments and other spacecraft in the event of a docking. LETF works closely with GRAF and supports the ISS and shuttle programs by helping them make the most of both natural and artificial light. LETF is also involved in the research of new lighting technologies, such as solid-state



NASA JSC 2002e08135 Photo by James Blair

Jim Maida, Graphics Research and Analysis Manager, confirms a total reflectance measurement for a target to be used in an illumination modeling system. Also shown is Kim Tran of Johnson Engineering.