

Bring Our Children To Work Day 2006

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Johnson Space Center welcomed hundreds of kids on its annual Bring Our Children To Work Day in June. This year's theme, "Where We've Been, Where We're Going," focused on NASA's plans to explore the moon, Mars and beyond. Kids got to see where their parents work, learn what they do every day and see exciting presentations about space exploration.

Above, Richard Watson, of JSC's Crew and Thermal Systems Division talks about spacesuit technology.

At right, the children take in a spaceflight presentation.



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Space Center Roundup

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Constellation program

NASA's Constellation Program is getting to work on the new spacecraft that will return humans to the moon and blaze a trail to Mars and beyond. This artist's rendering represents a concept of rendezvous and docking operations between an unmanned crew vehicle and a manned lunar lander.

FROM THE director

A MESSAGE FROM CENTER DIRECTOR MICHAEL L. COATS



Keeping things in perspective

I write this column a month in advance, so my expectation is that *Discovery* is safely in orbit, we are enjoying the success of the STS-121 mission and recognizing the hard work of the thousands of folks on our Team NASA.

We read a lot about how old the shuttle is, but it will be many decades before we see another spaceship with similar capabilities. Getting back into the business of flying the shuttle on a regular basis is important to each and every one of us, but it is also a symbol of national pride and technological strength.

We have just celebrated America's independence, and I hope everyone has had a terrific Fourth of July holiday! While we are accustomed to thinking of ourselves as a "young" nation, our 230 years of history make us one of the oldest systems of government on Earth. We often get so busy in our daily lives that we forget we live in an amazing time in an amazing country.

The media concentrate on the negative, but the fact is that by almost any measure we live in the best of times. Despite the wars in Iraq and Afghanistan, fewer people were killed in worldwide conflicts last year than at any time in recorded history. We complain about the cost of health care and prescription medicines, but we have the best medical care in the world by far. It is available to more and more people, and our medicines have to be considered "miracle drugs" by any reasonable definition. After years of slow progress, we are now making significant headway in the fight against cancer and may well see cures in our lifetimes. Life expectancy has increased dramatically over the last century. (Our associate director, Randy Gish, not only has grandchildren, but his grandparents are still healthy! Good genes, I'm sure, but in general we can all expect to live longer and healthier lives.)

As engineers we tend to want to fix and "improve" everything, but the challenges we face today are no more serious than at any other time in history, and the quality of life is dramatically better. It's natural to complain, and as Americans we have a First Amendment right and responsibility to do so, but we also need to keep things in perspective. Our nation has much to be proud of, and the space program, which is visible evidence of our passion, spirit and belief in the future, is one of **our** proudest achievements.

I would once again encourage everyone to get more involved with our local community. Despite the heat, humidity and hurricanes, this is a terrific place to live and work because of the people who make up the community. We need to support the local governments, schools, clubs and activities to continue to provide our children with all the amenities we enjoy.

BED-REST PROJECT STUDIES ARTIFICIAL GRAVITY

Lying down for science

by Bill Jeffs

It's an admirable thing to stand up for one's beliefs. But recently, some brave individuals went a step further by lying down in the name of science.

They were participating in an artificial gravity study led by Johnson Space Center and the Massachusetts Institute of Technology. Weightlessness can have negative effects on the human body—for instance, muscle and bone loss—and artificial gravity may help mitigate those effects. The study was designed to test that theory.

"Artificial gravity has long been limited to the province of fiction writers and artists," said Dr. Bill Paloski, NASA principal scientist in JSC's Human Adaptation and Countermeasures Office.

Paloski is the principal investigator for the project, which is conducted at the University of Texas Medical Branch at Galveston and is scheduled to run throughout this year. "This study is our first attempt to scientifically evaluate a practical prescription for its use in space as a multisystem countermeasure," he said.

Volunteers for the study spend three weeks lying down in a bed that is tilted by six degrees so that their heads are lower than their feet. This position simulates the effects of weightlessness on the body, and can result in some of the same health effects after a long period of time.

Some of the volunteers, the "treatment" subjects, take a spin each day on a short-radius centrifuge (SRC) to determine how much protection it provides from bed-rest deconditioning. These subjects are positioned on the centrifuge in the head-down bed-rest position and spun up to a force equal to 2.5 times Earth's gravity—2.5 Gs—for an hour. Then they return to their beds. The "control" subjects also spend an hour each day on the centrifuge, but they are not spun.

The SRC has two "arms," each about 10 feet long. Subjects lie on narrow, bed-like sections. The faster the arms spin about the SRC's pivot point, the higher the Gs created by centrifugal force. An instrumented foot plate measures G-forces at the subject's feet.

The platform that subjects lie on slides back and forth—or up and down, from the subjects' perspective. They can pump their legs, keeping the blood flowing to their head. Test subject Timothy Judd said that the movement was "like a leg press in a weight room."

Judd, the second subject to complete the study, wrapped up his 41-day test run in May. For him, a good part about spending a lot of time in bed was the chance to catch up on watching movies. However, he said he had trouble relying on others for constant assistance.



A view of part of a NASA-provided short-radius centrifuge at UTMB in Galveston.

"What I did find difficult was going from an independent, do-it-yourself mentality to a full dependency on others," he said. For example, Judd said he had to adjust to asking for his toothbrush and having someone else put his socks on.

The spinning centrifuge did not bother him, he said.

"Oddly enough, it is not like spinning at all," said Judd. "The centrifuge operator turns down all the lights, so you lose all points of reference in the room. It feels as if you were standing stationary with a heavy backpack—maybe 50 pounds or so—on your shoulders."

After the study, Judd said his first steps were a little unsteady.

"I felt that I had awakened from hibernation," he said. "My back was a little stiff, and I just felt groggy in the same way you feel when awakening from a deep sleep. When they allowed me to take a couple steps toward the wheelchair, the biggest thing I felt was a loss of confidence in movement."

Paloski said that scientists still have a lot of work to do in studying artificial gravity and its role in future space exploration.

"Because gravity affects many of the body's systems, we may need to look at a number of possible prescriptions before we can settle on one that would be best for future long-duration space travelers," said Paloski, adding that there may be a need for future volunteers for the study.

To find out more about the JSC Human Test Subject Facility, visit <http://www.bedreststudy.com/default.aspx>.