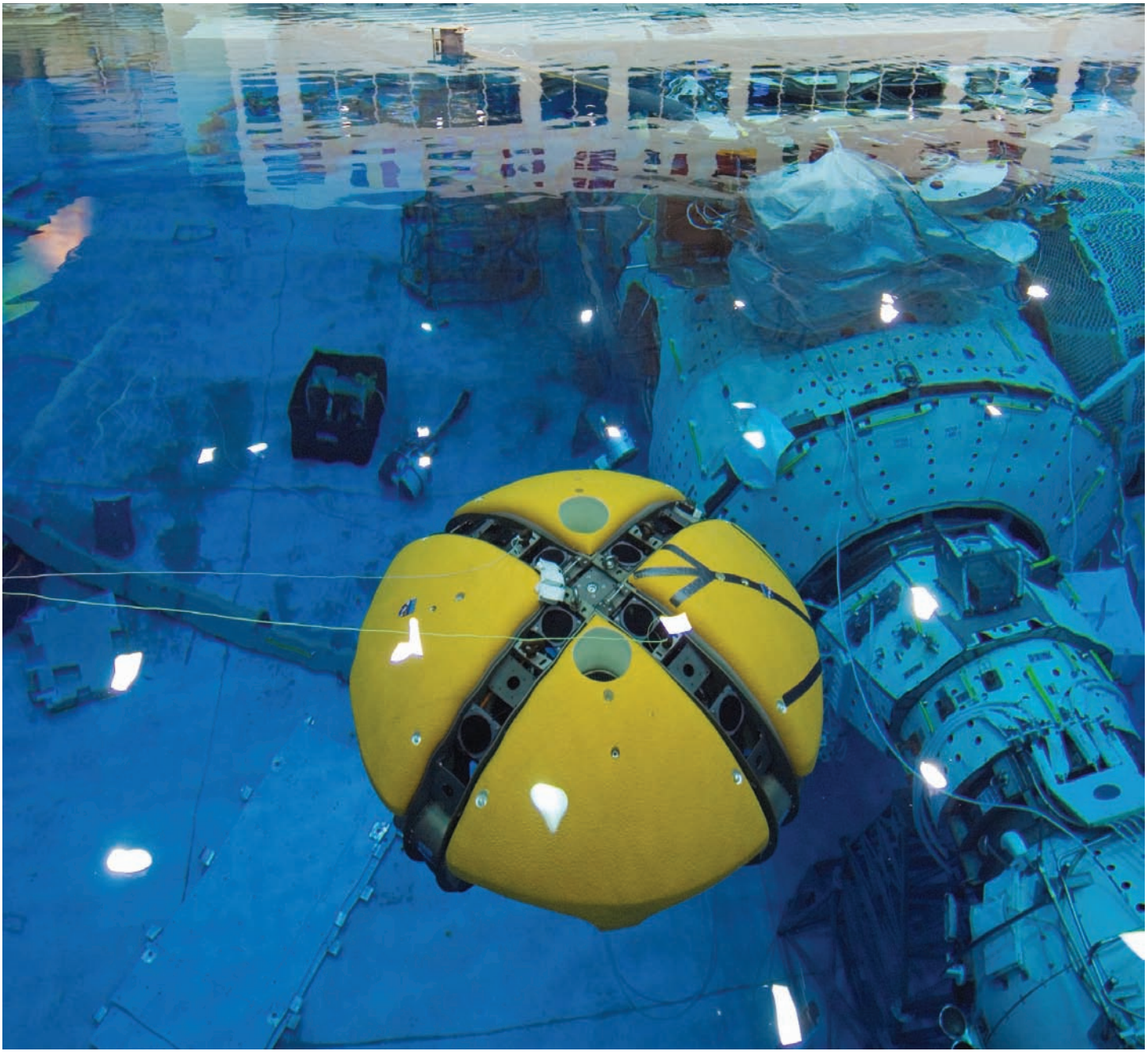
National Aeronautics and Space Administration

Lyndon B. Johnson Space Center

roundup



NASA/BLAIR JSC2008E048067

Make a splash

AUGUST 2008 ■ volume 47 ■ number 8

guestcolumn

Motivation

Motivating employees really starts with motivating yourself. If you hate your job, it seems like everyone around you hates theirs too. If you are stressed, everyone around you is stressed as well. Enthusiasm, on the other hand, is contagious. If you're enthusiastic about your job, it's much easier for others to be enthusiastic about their job. Also, if you're doing a good job of taking care of yourself and your own job, you'll have much clearer perspective on how others are doing in theirs.

A great place to start learning about motivation is by understanding your own motivations. The key to helping motivate your employees is to understand what motivates them. So what motivates you? Consider, for example, time with family, recognition, a job well done, service, learning and more. How is your job configured to support your own motivations? What can you do to better motivate yourself?

We should always be working to align goals of the organization with goals of employees. As I mentioned, employees can be excited about their job and be working very hard. However, if the results of their work don't contribute to the goals of the organization, then the organization is not any better off than if the employees were sitting on the sidelines. They're probably even worse off. Therefore, it's critical that managers and supervisors know what they want from their employees. These preferences should be worded in terms of goals for the organization.

Identifying the goals for the organization is usually done during strategic planning. Whatever steps you take to support the motivation of your employees will ensure that these employees have strong input to identifying their goals and that they are aligned with the organization's goals. Participation and ownership are critical in making it stick.

The key to supporting the motivation of your employees is understanding what motivates each of them. Each person is motivated by different things, and finding this out should be your first step. You can accomplish this by asking them, listening to them and observing them.

It is important to recognize that supporting employee motivation is a process, not a task. Organizations change all the time, as do people. It is truly an ongoing endeavor to sustain an environment where each employee can strongly motivate themselves. If you look at sustaining employee motivation as an ongoing process, then you'll also be much more fulfilled and motivated.

Bobby Watkins
Chief of Staff

On the cover

An Autonomous Underwater Vehicle called Endurance is lowered into the 6.2 million gallon pool at Johnson Space Center s Neutral Buoyancy Laboratory. Seen below is a mockup of the International Space Station for astronaut training.

Spotlight on...
Darryl Gaines

Manager, Cargo Integration Office

NASA/HARNETT JSC2008E049846

Q: How long have you been with NASA?

A: My career with NASA started at Marshall Space Flight Center in Huntsville, Ala., on June 3, 1991, in the Avionics and Software Laboratory. In 2001, I moved to Houston to begin working in the International Space Station Avionics and Software Department as the lead for Station Program Notes. After a short while, I became the Station Management and Control lead in the Avionics and Software Department. In October 2005, I moved to the station Mission Integration and Operations (MIO) Department as manager of the Planning Integration and Imagery Office. I began 2008 as manager of the Cargo Integration Office within the MIO Department.

Q: What kind of hobbies or interesting things do you do away from the office?

A: I have a variety of things I'm involved in away from work, including writing poetry and soon to be publishing a book of compilations. I'm working on a self-paced course in keyboarding and consider myself to be an intermediate-level sound-board operator. I volunteer as a sound engineer at my church, where most of my training is put to the test in a live setting. Like NASA, it's a dynamic environment which requires me to be prepared for real-time changes.

Q: What is your favorite CD/music artist?

A: I'm a jazz buff. Some of my favorites are Grover Washington Jr., David Sanborn, George Benson, Boney James and Gerald Albright, who's a personal friend. Love those R&B favorites from the '80s as well.

Q: What is the last good book or article you read?

A: Miles Monroe, "Kingdom Living," a very inspiring and thought-provoking book. Warren Buffett, "Essays of Warren Buffett: Lessons for Corporate America."

Q: What is the coolest part of your job?

A: It's very rewarding to successfully plan activities and resolve issues in support of the most complex endeavor ever undertaken in the history of humankind. As a manager in such a dynamic environment, it's even more gratifying when you successfully face the challenges of technical and management issues while working through the unpredictability that each day brings.

Q: What does JSC mean to you?

A: Johnson Space Center has provided me an opportunity to excel and to learn on both a technical and a personal level. I've been fortunate to participate in some amazing accomplishments alongside some amazing people.

Q: What do you look forward to at NASA?

A: I look forward to being a part of a new era at NASA in using commercial space transportation, supporting Constellation and returning to the moon. NASA has a great future in leading the nation in space.

Q: What is your best memory at JSC?

A: I would have to say Return to Flight was the most memorable. To get past all of the reviews, analysis and scrutiny and (get) back to doing what we do best.

Q: What is your favorite quote?

A: Be true to thyself.

Q: Who are your heroes?

A: Martin Luther King is my favorite. The people I most admire are teachers. I can remember several of my teachers who took time with troubled students—teachers who were passionate about what they were doing.

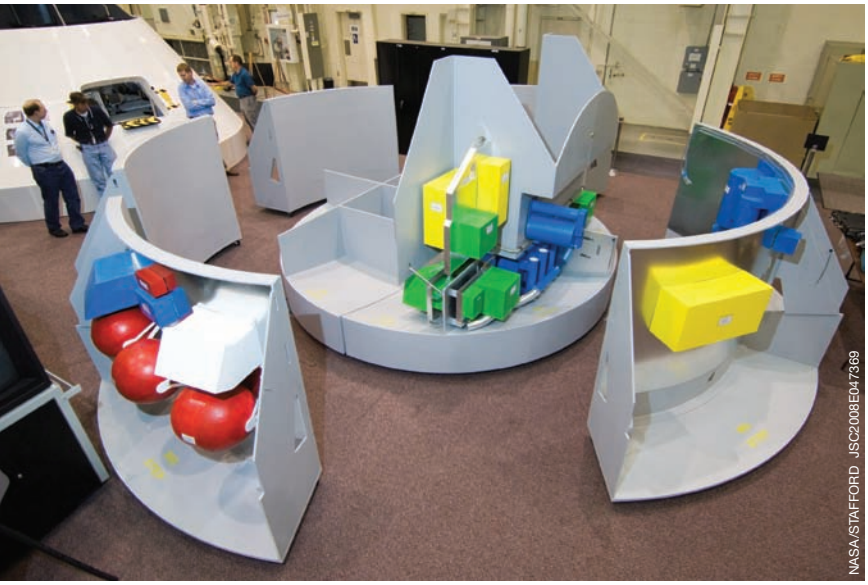
WANTED!

Do you know a fellow JSC team member who does something extraordinary on or off the job? Whether it's a unique skill, interesting work, special professional accomplishment, remarkable second career, hobby or special volunteerism, your nominee may deserve the spotlight! The Roundup shines the light on one person each month who is chosen from a wide cross section of the JSC workforce. To suggest a "Spotlight" candidate, send your nomination to the JSC Roundup Office mailbox at jsc-roundup@mail.nasa.gov with the person's name, title and brief description of why he/she should be considered.

Crew Module Mockup Team takes design from 3-D to reality

By Linda Singleton, *Orion communications manager, Lockheed Martin*

The Lockheed Martin Orion Project team recently assembled a full-scale Crew Module Aft Bay/Subsystems mockup in Johnson Space Center's Space Vehicle Mockup Facility, also known as Building 9. This low-fidelity mockup is a useful, hands-on tool that helps design engineers reduce in-flight risks associated with the position and layout of subsystem components in the Orion crew exploration vehicle. Flight computers and life-support systems are examples of the subsystems that rest behind the crew cabin walls and floor within the pressurized area of the crew module. Other subsystems, such as propulsion tanks, thrusters and fuel lines, lie in the lower, unpressurized aft bay area of the vehicle.



The Crew Module Aft Bay/Subsystems mockup is shown in its expanded configuration. The foam blocks that represent subsystem hardware are color-coded for easy identification: green, Avionics; blue, Environmental Control and Life Support Systems; yellow, Power; red, Propulsion; and white, Interface Panels.

According to Scott Baird, Orion Crew Module Office manager for the Crew Module Aft Bay/Subsystems mockup, this project is the result of a four-month-long team effort of project offices, NASA centers and contractors.

"It is critical that we have the designers, builders and crew members all working together to create the best possible vehicle design for Orion," Baird said. "The Vehicle Integration Office and the Crew Module Office provided valuable information to the Lockheed Martin design team to ensure that we had appropriate representation of all the subsystems needed to support the crew exploration vehicle aft bay design."

Lockheed Martin aeronautical engineer associate Mike Wells served as the lead designer for the mockup and worked closely with engineers at NASA, Lockheed Martin and Hamilton Sundstrand during the fabrication process.

"We knew that this mockup was going to get a lot of use, so we designed it to be easy to reconfigure and affordable to modify," Wells said.

This full-scale, 3-D model gives engineers a real-life perspective that cannot be seen on computer-generated designs. Wells explained that the mockup is comprised of 10 sections built from lightweight plywood and galvanized steel. The sectional design, coupled with the use of rolling casters, magnets and lightweight foam-block components, allows for myriad engineering and design evaluations that can be conducted on individual sections or on the unit as a whole. The foam blocks that represent subsystem hardware are color-coded for easy identification: green, Avionics; blue, Environmental Control and Life Support Systems; yellow, Power; red, Propulsion; and white, Interface Panels.

"Obviously, any time you build something new, you don't know what you're going to find until you find it," said Jeff Fox, senior cockpit engineer for NASA's Orion Project. "That's why this mockup is a key step in the design process for Orion. We can identify and prevent costly design changes and operational workarounds that can occur after a vehicle is built. I was very impressed with the creative design of this mockup in that the Lockheed Martin team incorporated inexpensive foam blocks representing the subsystem hardware. This design allows us to quickly and easily change and reassess the subsystem layout very early in the vehicle development process."

A computer-aided design (CAD) system will soon be installed next to the mockup so that the CAD images can be updated simultaneously as engineers make real-time changes in the physical layout.

Baird explained that the Crew Module Aft Bay/Subsystems mockup will be used by design, assembly and operations teams from around the country, including Kennedy Space

NASA/STAFFORD JSC2008E047333

Crew Module Aft Bay/Subsystems mockup team members, pictured from left: Jeff Fox, Scott Baird, Kent Talbot of Lockheed Martin, Mike Wells and Chris Harding.

Crew Module Aft Bay/Subsystems Mockup Team Members:

NASA/JSC ORION PROJECT:

Scott Baird
Orion Crew Module Office manager for the Crew Module Aft Bay/Subsystems mockup

Jeff Fox
senior cockpit engineer for NASA's Orion Project

Christie Sauers
Building 9 crew module mockup lead for the Orion Cockpit Working Group

Michael Burlone
NASA CAD designer

LOCKHEED MARTIN ORION PROJECT:

Mike Wells
aeronautical engineer associate, lead designer

Wayne Wondra
principal manager

Kent Talbot
project lead

Chris Harding
engineering intern from The University of Texas

David Kroen
lead technician

Ricky Rodriguez
technician

Mike Peel
engineering consultant

Ray Wilson
fabrication

Larry Chien
design

NASA/STAFFORD JSC2008E047324

Wells, foreground, and Harding configure the components on the outer wall of the aft bay mockup.

NASA/STAFFORD JSC2008E047330

Wells attaches a green foam block representing a remote interface unit component onto the mockup.

Center, JSC and Lockheed Martin, to assess component placement, fit checks and the interconnectivity between the subsystems.

"We enjoyed a great team environment working closely with the Lockheed Martin group to develop a functional, changeable mockup to meet our design needs at this stage of vehicle development," explained Christie Sauers, who leads the Building 9 crew module mockup efforts for the Orion Cockpit Working Group. "This mockup should remain in the Space Vehicle Mockup Facility through late 2009, when the full-scale, medium-fidelity mockup is scheduled to be installed. The higher-fidelity mockup should enable us to assess the vehicle's baseline design and conduct crew member operability testing and verification. These assessments will aid in the design refinements needed for the vehicle's Critical Design Review scheduled for fall 2010."

The Orion crew exploration vehicle will be the flagship of NASA's Constellation Program, which is comprised of the spacecraft and systems that will carry astronauts to the International Space Station and conduct sustained human exploration of the moon and Mars. The first crewed mission of Orion is currently scheduled for spring 2015. Lockheed Martin serves as the prime contractor to NASA to build the Orion crew exploration vehicle. Lockheed Martin Orion Project partners include Aerojet, Hamilton Sundstrand, Honeywell, Orbital Sciences Corporation and United Space Alliance.

NBL to pool its resources in attracting outside clients

NASA/BLAIR JSC2008E048070

By Heather Nicholson

You won't see any classified ads or Craigslist announcements, but the Neutral Buoyancy Laboratory (NBL) at Johnson Space Center is looking for clients. Use of the facility to train astronauts in spacewalks will decrease once the shuttle retires in 2010, but that doesn't mean the NBL can't still be put to good use.

Touted as a "national asset," officials at NBL are already looking at ways to keep the facility and 6.2-million-gallon pool open during NASA's transition from shuttle to the moon.

"NBL is solely a support and training facility right now," said Robert Durkin, NBL deputy chief. "In 2010, there will be a drop-off in activity because of shuttle retirement. We are looking at other government agencies and commercial entities willing to come here and basically pay the bills (to) maintain the facility."

Even though the lab is funded through 2016, activity at the NBL will drop from 320 events annually to about 220 after shuttle retirement.

"Once the shuttle retires, there will be (Orion) activity, but not enough to maintain (the facility)," Durkin said. "This place is viable for NASA projects, and if we shut it down we can't just start it back up for a week of work."

Susan Sinclair, EVA, Robotics and Crew Systems Operations technical assistant recently assigned to find prospects to lease NBL said, "We're looking for people who have a technical project or (need to) support the NASA mission. Even in the oil and gas industry there is some commonality that we could tap into."

And it's not just a giant swimming pool they're offering either. The Sonny Carter Training Facility provides controlled neutral buoyancy operations to simulate the zero-g or weightless condition that, for non-cosmos-seeking companies, is a controlled test area with clear water and underwater video and photography. In addition, there is a full audio communications system, an above-water control center and a hyperbaric chamber.

The facility has been an essential tool for the design, testing and development of the International Space Station and future NASA programs. For flight crews, the NBL provides important pre-flight training for spacewalks.

"We have this unique tank that has the ability to test imaging – sonar and digital," said Glenn Piper, flight lead at the NBL. "From a NASA point of view, we're trying to open up this facility to commercialization."

NASA/BLAIR JSC2008E048049

Members of Stone Aerospace lower an Autonomous Underwater Vehicle into the NBL pool at the Sonny Carter Training Facility. Stone Aerospace is the first client NBL has attracted to utilize its facility during NASA's transition.

NASA/BLAIR JSC2008E048069

The AUV capsule descends into the NBL pool, where a mockup of the International Space Station sits for astronaut training. The NBL was used to test the AUV for work on Europa, Jupiter's sixth moon. It is hoped that the capsule will discover forms of life amid Europa's ice and water.

Piper said not a lot of interest has come their way yet, but they hope to appeal to agencies such as the U.S. Navy's dive team, the U.S. Parks and Wildlife Department and underwater exploration teams in the oil and gas industry.

"It's a national asset if we can keep it up," Durkin said.

'OUR FIRST PAYING CUSTOMER'

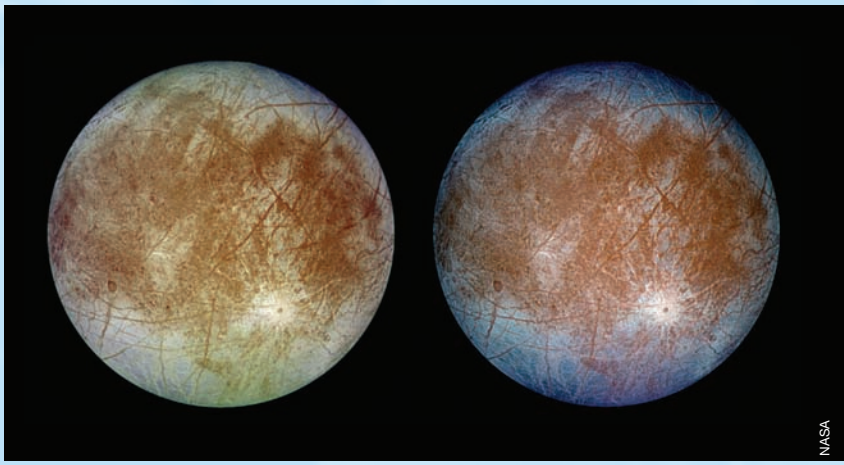
Stone Aerospace is a Texas-based company that builds systems to explore space and underwater. They visited JSC's Sonny Carter Test Facility on June 21 to test their latest design, the Autonomous Underwater Vehicle (AUV), also known as Endurance.

Endurance is a prototype for developing and testing two of the most critical capabilities that will be needed to explore Europa, Jupiter's sixth moon. The icy landscape of Europa makes the AUV a perfect vehicle for delving underwater to collect microorganisms, thus possibly discovering life on Europa.

This testing event was monitored by not only Stone Aerospace engineers, but NBL staff as well. National Geographic was also on hand to take photographs for their publication. The 6 ½ -foot, 3,000-pound NASA-funded robot sub has already been tested in Wisconsin's icy Lake Mendota, with plans to take it to Antarctica soon.

To find life, the AUV will have to employ a multistage detection system. If successful, it will detect and characterize microorganisms (most likely bacteria or Archaea) in the Europan ocean and return it to the fast mover, which will then drive it back to the navigation beacon for upload to the surface lander. The surface lander should then be able to relay the information back to the orbiter, which will relay it back to Earth.

The test conducted at NBL exercised and verified the AUV's ability to detect, track and inspect a vertical wall autonomously without external input or control.



NASA

Europa, a large moon of Jupiter, has a surface made of ice, which may have an ocean of water beneath it. Such an ocean could provide a home for living things, which is what Stone Aerospace is hoping for with the AUV, Endurance.

Space rocks!

NASA astronauts play in rock band when not exploring cosmos

NASA/BLAIR JSC2005E34228

The crowd loved Max Q at the STS-114 Mission Success Celebration at Space Center Houston in 2005. On stage are astronauts Daniel Burbank, Tracy Caldwell, STS-114 crew member Stephen Robinson, Drew Feustel and Chris Hadfield.

By Heather Nicholson

Few people in this world can describe the feeling of a space shuttle rocketing them out of orbit. Even fewer relate that feeling to the epic sound of Queen or a hard riff from Led Zeppelin.

When strapped into the space shuttle and the engines start to roar, astronaut Chris Hadfield says the whole world starts to shake and rumble, and it is the "most rock 'n roll moment of spaceflight."

It's not hard for Hadfield and 10 other NASA astronauts to relate their space journeys to music, because the small group of pilots and scientists are also in a local rock band when not exploring the cosmos.

They call themselves Max Q, after the engineering term for the maximum dynamic pressure from the atmosphere experienced by an ascending spacecraft. The name was thought up by former member Robert Gibson who jokes that, like the space shuttle, the band makes a lot of noise but no music. Since its inception in 1994, the band's members are constantly changing due to flight crew assignments, training and the occasional retirement, but they continue to play at local venues around the Clear Lake area, at NASA events and at a post-Katrina event in Louisiana.

The band got its start at Johnson Space Center as a kind of unofficial induction into the astronaut corps.

"As a junior member of the astronaut class, you are required to entertain the others," said Hadfield, who plays bass guitar. "We would play guitar and sing to each other."

The band currently includes Kenneth "Taco" Cockrell on the keyboards; Daniel Burbank on guitar; Tracy "TC" Caldwell as vocals; Stephen "Stevie Ray" Robinson as lead guitar; Gregory "Box" Johnson on keyboards; Kevin Ford on

NASA/MARKOWITZ/BLAIR/SANCHEZ

Guitarist Drew Feustel plays with Max Q at special NASA events.

drums; Richard "Ricky" Arnold on guitar; Andrew "Drew" Feustel as lead guitar; Christopher "Fergy" Ferguson on drums; Chris Hadfield on bass guitar; and Dorothy "Dottie" Metcalf-Lindenburger as vocals.

People might be surprised to know that scientists and military personnel make up a musical group, but Hadfield said astronauts balance their technical and creative sides quite well.

"People think we are all these dry, technical droids, but it's not like that at all. There is such a depth of ability in this office … it's awe-inspiring," Hadfield said.

Richard Arnold, guitar player, said he wishes he worked nearly as hard at being a musician as he does an astronaut, but he thinks they both go hand-in-hand.

"Stereotypes are frequently wrong. We use creative problem-solving all the time around here," Arnold said.

This cover band plays classic rock 'n roll songs that get people dancing. From ZZ Top and the Rolling Stones to Alanis Morissette and 3 Doors Down, Max Q has a long list of songs they like to play.

"A lot of the songs are legacy songs that were played before most of us joined the band," Hadfield said. "But there are a few we had to retire."

By a majority vote, Max Q recently retired several tunes lovingly called "the songs we love to hate." They include, "Achy Breaky Heart," "She Drives Me Crazy," "Jump" and "When A Man Loves A Woman."

Arnold said Max Q is a good outlet for the astronauts when away from work.

"Life here at JSC is pretty busy, so it is always fun having a good reason to get together outside of work and catch up a bit," Arnold said.

Max Q does not have a Web site, but fans can find them playing in Kemah during the Rock the Dock on Thursday nights, in Galveston and at Space Center Houston special events and private parties.

NASA/BLAIR JSC2003E52124

Max Q performed at the Space Flight Awareness 40th Anniversary Celebration in the mall area outside Building 1 in 2003. From left are astronauts Daniel Burbank and Andrew Feustal on guitars, Kenneth Cockrell on keyboard and Jim Weatherbee on the drums.

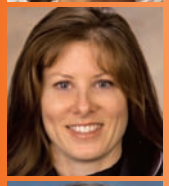
NASA/BLAIR JSC2004E39204

Astronaut Tracy Caldwell sports a rock chick T-shirt and sings at the Ballunar Liftoff Festival.

MAX Q band members

Kenneth Cockrell
Nickname: Taco
Instrument: Keyboards
Astronaut: since 1991

Daniel Burbank
Nickname: none
Instrument: Guitar
Astronaut: since 1996



Tracy Caldwell
Nickname: TC
Instrument: Vocals
Astronaut: since 1998

Stephen Robinson
Nickname: Stevie Ray
Instrument: Lead guitar
Astronaut: since 1994

Gregory Johnson
Nickname: Box
Instrument: Keyboards
Astronaut: since 1998

Kevin Ford
Nickname: none
Instrument: Drums
Astronaut: since 2000

Richard Arnold
Nickname: Ricky
Instrument: Guitar
Astronaut: since 2004

Andrew Feustel
Nickname: Drew
Instrument: Lead guitar
Astronaut: since 2000

Christopher Ferguson
Nickname: Fergy
Instrument: Drums
Astronaut: since 1998

Chris Hadfield
Nickname: none
Instrument: Bass guitar
Astronaut: since 1992

Dorothy Metcalf-Lindenburger
Nickname: Dottie
Instrument: Vocals
Astronaut: since 2004

on balance

Scientist probes workings of the inner ear

By Bill Jeffs

High-tech, sci-fi-like devices are being used to translate, tilt and rotate human subjects with the goal of better understanding and possibly counteracting sensorimotor disturbances crew members might experience following long stays in space.

"We're interested in the part of the inner ear that detects your orientation relative to gravity," said Dr. Scott Wood, a scientist with Universities Space Research Association in the Human Adaptation and Countermeasures Division of the Space Life Sciences Directorate at Johnson Space Center. "What drives our research is the observation that changes in how the nervous system optimizes the use of sensory information to move about in a microgravity environment can lead to disorientation and balance disturbances when entering a new gravitational field."

Wood is funded, in part, by the National Space Biomedical Research Institute (NSBRI), a NASA-funded consortium of institutions studying health risks related to long-duration spaceflight.

"Our nervous system is designed with a wonderfully redundant set of specialized sense organs," Wood said. "Our ability as humans to sense orientation and move in our environment depends on a learned ability to integrate information from these different sensory receptors. This redundancy also helps provide a means of adapting to new environments. For example, when we tilt our head on Earth, our brain receives information from vision, from receptors in the neck and from the vestibular system in the inner ear. When a crew member makes the same head tilt movement in microgravity, however, there is a different input from the otoliths of the inner ear which detect linear acceleration.

"The otolith continues to signal linear motion in space, such as translating from one location to another, but no longer signals orientation relative to upright. Over time, the brain gets used to the unique pattern of sensory feedback experienced when moving in microgravity. Then, as astronauts transition to a new gravity environment (Earth, moon or Mars gravity), they need to adjust again to a different pattern of input from the otolith system. As a result, crew members may misperceive their orientation and motion," Wood said.

NASA/BLAIR JSC2008E049945

A view inside the cockpit as the subject prepares to perform a manual control experiment on the motion simulator.

Built by the Naval Aerospace Medical Research Laboratory, the tilt-translation sled recreates some aspects of the motion cues that astronauts experience in space. Each subject sits on a chair that can be oriented to tilt side to side or front to back. The chair is completely enclosed in an 8-foot square box, or cockpit, that slides back and forth on an air-bearing track. Inside the box, different visual scenes can be projected on screens to either enhance or decrease the illusion of motion experienced by the subject.

"By synchronizing the tilting and the translation motion, the resultant force vector remains aligned with the person's long-body axis so the otoliths do not signal the tilt relative to gravity," Wood said. "So it's (comparable) to the confusing sensory pattern crew members experience in weightlessness."

NASA/BLAIR JSC2008E049949

Preparations for a spin on the Variable Radius Centrifuge include adjustments to a face mask that records eye movements in complete darkness.

NASA/BLAIR JSC2008E049947

The subject is positioned in the sled so that the tilt and translation stimuli can be synchronized to mimic the lack of orientation cues from the otoliths in the inner ear as encountered during spaceflight.

The device is also being used to study whether a sensory vest can improve pilot performance through the use of small vibrators (similar to pagers) located along the torso. As the pilot moves off course in one direction, the vibrotactile stimulation can provide a warning signal to the pilot to make a corrective action.

Use of the vibrating vest may have application for a lunar landing, where blowing dust may obscure vision and create the illusion that one is drifting when one is not actually drifting. NSBRI recently awarded a new project to use the sled to simulate manual takeover of a lunar landing while experiencing different motion illusions.

A different type of motion simulator, the variable-radius centrifuge, provides a different test of otolith function. As subjects rotate at a constant rate in darkness, within a few minutes they no longer sense rotation. The subjects are then translated a short distance off center so that one ear is exposed to the centrifugal force while the other is not.

Wood is using this device with European Space Agency investigators to study how otolith asymmetry affects crew members' ability to adapt to space. Just as people may have one dominant eye, they also may have dominant sensory organs in one ear.

Some crew members adapt well to space while others have more difficulty moving about or suffer from motion sickness during transitional periods. One hypothesis as to why this difference occurs is that there may be an inherent otolith asymmetry in some people that they are not aware of until they are placed in a novel environment such as space.

"Our goal is to apply results to improve spatial orientation and navigation on different acceleration platforms, including landing systems used for return to Earth after long-duration space travel or during space exploration missions," Wood said. "The results of our research are also relevant to understanding compensatory processes following loss or disruption of otolith function in patients suffering from balance disorders."

NASA/BLAIR JSC2008E049948

Laboratory members in front of the tilt-translation sled are, from the left: Kara Beaton, Justin Barba, Krystin Ramos, Deborah Harm, Wally Kulecz, Elizabeth Fisher, Elisa Allen, Jan Cook, Scott Wood, Robert Vanya and Joleen Kayanickupuram. (Not pictured are Joe Sinka and Matthew Fiedler.)

Coats in the trenches

Center Director Mike Coats, left, and James Lewis look over the Constellation Program's Low Impact Docking System.

Center Director Mike Coats and his staff recently toured Johnson Space Center's 6 Degree of Freedom Facility in Building 9, where representatives from the Engineering Directorate gave them an overview of the Constellation Program's Low Impact Docking System. This new common docking mechanism will allow the Orion vehicle to dock to the International Space Station and other lunar and Mars mission vehicles.

From left, Matt Ondler, Beth Fischer, Coats, Milt Heflin, Bobby Watkins and Lucy Kranz.

From left, Watkins, Lewis, Ellen Ochoa, Fischer and Coats.

Space Center Roundup

The Roundup is an official publication of the National Aeronautics and Space Administration, Johnson Space Center, Houston, Texas, and is published by the Public Affairs Office for all Space Center employees. The Roundup office is located at 2200 Space Park Drive, Rm. 220. The mail code is AP22. Visit our Web site at: http://www.jsc.nasa.gov/roundup/online/ For distribution questions or to suggest a story idea, send an e-mail to jsc-roundup@mail.nasa.gov.

Catherine E. Ragin Editor
Heather L. Nicholson Assistant Editor
Perry Jackson Graphic Designer

PRSRT STD
U.S. POSTAGE
PAID
WEBSTER, TX
Permit No. 39