

Stepping stones: *JSC astromaterials team prepares for future*

By Nicole Cloutier

Protected by more than 18 inches of concrete and steel, a motion detector system and a sound build up alarm quietly resides the country's moon, meteorite, and cosmic dust samples in JSC's curation facility. But inside those reinforced walls, researchers and acclaimed scientists are piecing together the solar system's history bit-by-bit, while preparing to make some history of their own.

"Being NASA's home of extraterrestrial materials makes us a unique facility," said Dr. Carl Agee, chief scientist for astromaterials. "But the continued work here has prepared us for making history again – by receiving the samples that will be brought back from Mars in 2008."

A visitor's scan across the JSC campus would hardly suggest that one of our national treasures is neatly tucked away in Bldg. 31N. But there, the Lunar Sample Laboratory Facility houses the more than 842 pounds of lunar rocks, core samples and soils gathered during six Apollo lunar landings, plus a small amount (3/4 of a pound) from unmanned Soviet missions. Although the samples were collected more than 27 years ago, nearly 1,000 samples are distributed each year for continuing research and teaching projects.

Improvements in research technology along with fresh theories from budding researchers allow scientists to revisit unanswered questions and pursue new ones.

"Lunar sample research is not complete by any means—it is alive and well," said Andrea Mosie, a senior scientist for Lockheed Martin at JSC. "People sometimes visit the facility expecting to find a museum, but it's not. It is a working lab with research continuing everyday."

Mosie celebrated more than 24 years with the facility in June and provides an

invaluable "corporate memory" for the center. Others like her make up the lunar sample team, which experiences low turnover. Lunar sample processor Linda Watts similarly is a 22-year veteran of the team, and Dr. Gary Lofgren, head curator for the Lunar Sample Facility, has been on staff since 1968.

The goal Dr. Agee refers to is NASA's forthcoming missions to Mars for sample retrievals.

Although sample return missions aren't planned to visit the Red Planet until 2003, and a second in 2005, discussions are already under way about facilities needed to accommodate the samples once they arrive.

shower" before entering the 'pristine' laboratory. The samples are additionally contained in nitrogen-filled glove box cabinets. Samples are loaned out for external research, but only about 10 percent of the collection are considered compromised and are kept separated from the 'pristine' samples upon return.

All of these barriers are designed to protect the lunar samples from Earth oriented contaminants, but Mars samples will need two-way contamination control.

"We'll be investigating the Mars samples for life forms and organic compounds," said Dr. Lofgren. "This requires a new process to handle quarantine and analysis, both to protect the samples from Earth contaminants as well as protecting us from any unknown contaminants the samples might contain."

Reduced pressure, colder temperatures, and mimicking of a CO₂ rich environment are other facility issues still being considered.

The Mars samples will be coordinated in two separate phases: initial assessment, quarantine and analysis and then archiving, curation and distribution. Soon, NASA will assess various sites for these projects, including White Sands Test Facility, Ames Research Center and JSC. JSC's experience with the lunar samples uniquely positions it as a coordinating

site for the Mars samples, but it may be more than a year before an official decision is made.

Meanwhile, under the leadership of team member Dr. Eileen Stansbery, a new facility has been constructed in Bldg. 31N for the Genesis project. The facility is located directly beneath the lunar lab and will house specimens from the Genesis discovery mission. Genesis is a three-year mission scheduled to depart in 2001. ■



JSC Photo S99-06274 by Robert Markowitz

JSC's astromaterials team is gearing up for solar wind and Mars samples. Shown here is Dr. Gary Lofgren, head curator for the Lunar Sample Facility, with a sample from the lunar collection. Lofgren is joined by Andrea Mosie, a senior scientist for Lockheed Martin and Dr. Carl Agee, chief scientist for astromaterials.

"It's a rare find in itself," said Dr. Agee of the wealth of experience among the astromaterials team and the Planetary Sciences Branch of SN. After 8 years as an Earth and planetary sciences professor at Harvard, Dr. Agee joined JSC Director George Abbey's senior staff in August 1998 to lead the center's astromaterials research and to prepare facilities for Mars sample return. "The amount of enthusiasm and involvement from colleagues here at JSC, all working towards this common goal, all with lots of new ideas and approaches, makes for a very stimulating environment."

Compared with the lunar sample facility, which is a model laboratory, Mars presents many new issues to contend with.

"The lunar facility has turned out to be a wonderful stepping-stone for preparing us for the Mars samples," said Dr. Lofgren. "But the Mars samples will bring new challenges for clean room and laboratory processes, which is what we are working on now."

The lunar facilities, regarded as a level 1000 clean room, require researchers to gear up with full-coverage smocks ("bunny suits"), caps and gloves and undergo an "air

Employees empowered for safety: *Just plane safe*

By Kathleen N. Leonard

Whether you travel so much that the message "your mailbox has exceeded its limits" is a permanent part of your inbox or you only get out of the office once a year, there are things you can do that are "just plane safe" before and during a flight emergency. Moreover, school is out, summer is here; at this time of year families everywhere are planning getaways.

Dressing for success looks different when you have a meeting with an aircraft. Wear sensible clothing for ease of movement and protection in the unlikely event of an evacuation. Wear clothes made of natural fabrics such as cotton, wool, denim, and leather. Synthetics may melt when they are heated. Wear low-heeled shoes or boots (avoid sandals). High-heeled shoes will have to be removed before leaving the airplane via an escape slide. This will slow your departure from the airplane and put you at risk for severe injury from possible hazards such as broken glass or metal debris. Arms and legs should be as fully covered as possible.

Once you reach your seat, locate the closest emergency exit in front of you and behind you, and then count the seat rows to reach those emergency exits. This will be very helpful in case of evacuation in a smoke-filled airplane.

Maybe you have heard pre-flight safety briefings so many times that you automatically tune them out. Don't – things are subject to change! Listen to the them and read the safety data card in the seat in front of you. Know where the flotation devices are and how to use them. One of the best things you can do to be prepared is to plan the actions you would need to take in case of an emergency.

In a recent study, nearly 300 turbulence-related injuries to passengers were reported over a 10-year period. None of the injured had their seat belts fastened. You should keep your seat belt fastened at all times while in your seat – not just for take-off and landing.

The atmosphere in the airliner cabin is pressurized to about the same altitude as Denver, so any alcohol you consume will affect you more strongly than at sea level. The alcohol decreases the oxygen level in

your brain even further and you will get drunk even quicker. It will be extremely hard to keep your wits about you if you are involved in an emergency situation.

The mostly likely emergencies that you will face are an evacuation of the aircraft using the emergency slides or using the emergency oxygen system. In case of evacuation by the emergency slides, the best preparation is to be familiar with the locations of the exits, follow the commands of the flight crew, and wear slide friendly clothes (as mentioned earlier). Stay calm and proceed quickly to the nearest exit. Leave all your possessions behind. Jump feet first into the center of the slide. (Do not sit down to slide.) Place arms across chest, elbows in, and legs and feet together.

Emergency oxygen masks may be deployed automatically or be deployed manually by the flight crew. Pull oxygen mask toward you to start oxygen flow. Put your mask on as quickly as possible, then help children and others. Unfortunately in the event of aircraft fires, the oxygen masks on most airliners are unable to provide effective protection because most of

them allow the passengers to breathe ambient cabin air along with the supplementary oxygen.

In the past 20 years there have been a number of fatal airline accidents that were notable in that several passengers died not from injuries sustained from the crash, but from the effects of smoke inhalation. Passengers face two kinds of risks from aircraft fires: thermal injuries from the effects of heat and flame; and injuries from breathing the by-products of combustion.

In the event of a fire, use a wet paper towel or handkerchief to cover your nose and mouth. Use bottled water or saliva if necessary to moisten it. Stay low. Proceed your predetermined number of seat rows and/or follow floor proximity lighting to an exit. In the event of excessive smoke, your eyes may be burning or you may not be able to see floor lighting. That's why it is so important to count the seat rows to the nearest exits as stated earlier. It is up to each passenger to make good decisions concerning his or her safety and stay informed. IT IS "JUST PLANE SAFE." ■