

Astronaut candidates map fault in New Mexico

One of the many training activities provided to each new class of astronaut candidates (ASCANs) is a geology field trip to northern New Mexico. The instructor for these field trips is Dr. William Muehlberger, professor emeritus, University of Texas Department of Geological Sciences. Dr. Muehlberger has been training the astronaut corps in geology since the Apollo days.

In addition to geology training, the most recent ASCAN class, the Penguins, also participated in a geophysical exercise, which was a simulation for a Mars landing site investigation. This exercise was developed in collaboration with the New Mexico Bureau of Mines and Mineral Resources and the New Mexico Institute of Mining and Technology by Dr. Patricia Dickerson, a Lockheed Martin geoscientist at JSC; Dr. Paul Bauer, assistant director and senior geologist for the bureau; and Dr. Muehlberger.

"All the critical elements coalesced for this first field geophysical sim for planetary exploration: a need to assess the local water resources, well-defined scientific objectives, thoroughly professional project leaders from NMBMMR and NMIT, motivated and

perceptive explorers, and supportive center, directorate, and contractor management. All were vital," Dickerson stated, "but Paul and his coworkers assured our success."

The objectives of the exercise were to begin building an exploration experience base within NASA and to start training

the astronaut corps in geophysical methods appropriate for exploring Mars. Astronauts John Young and Jim Reilly participated in one of the field exercises to help validate the simulations.

The ASCANs used global positioning system equipment, laser-ranging devices, and gravity meters to collect gravity data

to define buried faults as part of an ongoing groundwater investigation. The data acquired by the class were processed and incorporated into a groundwater database for the Taos basin and the state of New Mexico.

The fact that this survey provided real data which addressed a pressing societal problem, in addition to providing valuable training, held strong appeal for the ASCAN group. The buried fault that the ASCANs helped locate and map will appear on the maps of the New Mexico Bureau of Mines and Mineral Resources as Penguino Fault. The data gathered will be published, with acknowledgment of the Penguins' contributions, as a scientific report by the bureau, as well as in their science news publication.

On April 7, astronaut Jim Reilly presented a JSC Group Achievement Award to Dr. Bauer to recognize the contributions of the geoscientists at the bureau and at New Mexico Tech for their contributions in making this exercise an outstanding success.

Peter Scholle, director of the bureau, sent a letter to JSC saying, "Thanks to all the folks at NASA for taking the time, energy, and expense to recognize this achievement." ■



Astronaut Jim Reilly, center, presents a JSC Group Achievement Award to Paul Bauer, left, assistant director for the New Mexico Bureau of Mines and Mineral Resources, and Peter Scholle, director of the Bureau.

Continued from Page 5

LEGENDARY

NASA JSC Aircraft Operations Division. "Many miscalculations about the effect of zero gravity have been corrected because of lessons learned in this aircraft and many procedures for crew operations for space were perfected in this aircraft. This aircraft represents a symbol of scientific discovery that we're very proud of."

Bob Williams, a well-known KC-135 test director, witnessed many of those discoveries.

"There were many, many pieces of space hardware that were developed and qualified in NASA 930 during my time spent with the program," said Williams, who recalls many high-profile, critical hardware tests that have since proven to be integral parts of our space program. For example, the new shuttle EVA suits nearly delayed the first shuttle launch until Bob Crippen tested them in the KC. Or the shuttle Orbital Maneuvering System fuel tanks, which presented a state-of-the-art system for delivering gas-free propellant to the OMS engines in orbit but were not able to be operationally demonstrated in 1 g.

The KC's value is truly apparent when testers discover the unexpected anomalies during reduced gravity-testing on board the plane.

"There were a number of pieces of equipment that were tested as just 'something to do' and found to be unacceptable because of unforeseen reactions to the zero-g environment," explained Williams. "One such piece was a 'space saw' designed to be used by an EVA crewmember to cut the 'dogs' that hold open the big cargo bay doors on the shuttle. Some folks were concerned that the aluminum saw dust generated by the saw would cause problems, so a zero g flight was flown with the saw enclosed in a dust collector box to see how the particles would behave as they were thrown off by the saw blade. The surprise came when, within two seconds of turning the saw on in zero g, the saw blade drive mechanism

came completely apart. The cog belt drive was somehow damped in 1 g, yet in zero g became undamped and came completely apart – a totally unexpected event, and one that could have proved disastrous if the saw had been needed for the emergency."

"We always enjoyed the flights where

Federal Aviation Administration in the Pacific Rim to verify navigation aids, the plane was retired from use and slated for the Davis-Monthan Air Force Base "boneyard." NASA obtained the aircraft from the FAA/USAF and completely refitted it to almost as-built condition and used it to a much fuller lifetime as the

zero-g parabolas. The hydraulic system reservoir was modified to keep it from losing fluid when the plane floats over the top, and we modified the oil cooler lines because the oil pressure varies a lot as the oil floats around the tank. We padded the interior and started to fly it in '73."

Since then, the aircraft has flown

58,236 parabolas – the last one in July 1995.

"This airplane has done an excellent job in playing a major role in our space program," said Roy. "And the way it is displayed is outstanding!"

"Many people made that happen," said Naughton. "The contributors to the zero-g program and 930's rich history start with the flight crews and the flight engineers who fly this aircraft to the edge of its envelope. Flying nearly 60,000 parabolas takes a lot of skill and a lot of effort. The program has been here at JSC for 27 years without accident or incident. That's remarkable."

Naughton credits the maintenance professionals for the aircraft's safe record.

"Without their day-to-day vigilance and professionalism, none of these flights would be successful," said Naughton. "This aircraft display is testament to the many people who contributed to 930's rich history. The Apollo 13 movie brought a

lot of fame to the KC-135 program, but this aircraft's real contribution was to the benefit of NASA's human space flight mission. 'Well done' to all who made that happen." ■



NASA JSC Photo 2000-04215 by Robert Markowitz

Area dignitaries join in a ceremony dedicating the historic NASA 930 at Ellington Field. Shown here, from left, are Mary Case, Ellington Field Airport manager; Rick Vacar, director, Houston Airport System; Houston Mayor Lee Brown; JSC Director George Abbey; Robert Naughton, JSC Aircraft Operations Division chief; and Chaplain Wayland Coe.

new foods and food packaging were tried out in zero g," added Williams. "The foods that are used on the shuttle are really pretty good. Naturally, when the food techs became a little 'upset' with flying the parabolas, someone had to carry on with the tests of the food."

NASA 930 flew its first parabola in September 1973. Originally used by the

Weightless Wonder IV.

"We picked it up in the early 70s and did a complete overhaul – which it needed," said Gordon Fullerton, the first pilot to fly NASA 930. Fullerton is now a research pilot at Dryden Flight Center. "Surprisingly few systems modifications were needed so it could fly the

Ellington Field itself has a great heritage in aviation history in this country, dating back to World War I when it was a training field. We are very pleased to dedicate this plane with the City of Houston for now it will be here for generations to come.

—George W.S. Abbey