**NASA probes Pinatubo's effects on atmosphere**

**By James Hartsfield**

The massive outpouring of volcanic material from Mount Pinatubo in the Philippines — believed to be double that of any eruption in the last century — has drawn a quick response from NASA atmospheric scientists.

A research team has gone to the West Indian island of Barbados to gather information that should help evaluate the global atmospheric effects of the event.

Headed by Dr. M. Patrick McCormick of NASA's Langley Research Center, the special research team consists of scientists from Langley, Ames Research Center, the National Center for Atmospheric Research and the Canadian Atmospheric Environment Service. Researchers also will receive near real-time data from satellites and computer predictions of the volcano's ash cloud locations.

"Volcanic aerosols are climate 'forcers' so it is urgent we get an early characterization of the stratospheric plume," McCormick said.

This effort will influence a number of future activities, including measurement scenarios for ground- and satellite-based sensors and development of chemical models of ozone depletion.

Flying in the NASA Lockheed Electra sampling platform, the group will take advantage of winds that are pushing giant pillars of smoke and gas toward the Caribbean.

The team arrived in Barbados last week. Its primary focus is to capture enough data about the composition, density and distribution of the volcanic clouds to form the basis for detailed analysis of potential global effects. Data from the cloud also will be incorporated into studies conducted this fall by NASA and other groups during the second Arctic Airborne Stratospheric Experiment, which will study the processes of ozone depletion in the Northern Hemisphere.

NASA scientists will stage their operations out of Grantley Adams International Airport, where a number of flights will probe the clouds with remote sensors aboard the Electra.

"Instruments aboard the plane will measure plume base, thickness, particle shape, spatial distribution, total direct diffuse radiation, optical depth and vertical columns of chemicals like sulfur dioxide and hydrogen chloride.

**By James Hartsfield**

There's a loose connection, a faulty source, too much noise and the countdown clock is ticking. It's a tough day at the office for Al Branscomb, the JSC vehicle manager who oversees preparing for space flight, and he holds to his schedule.

Branscomb leaves work, calmly drives awhile, then steps out, takes a deep breath and dials his voice to the limit — not in the proverbial scream but in four-part harmony that's an American original made famous during the days of vaudeville.

Branscomb and fellow JSC employee Lloyd Erickson, manager of the JSC Management Information System Project (JMS), are among about 125 self-proclaimed caretakers of barbershop quartet singing in Houston by both a grand 85-member chorus and traditional quartet.

The Houston Tidelanders perform throughout the year around the city, most recently at the Cynthia Woods Mitchell Pavilion with the American Pops Orchestra and at the Houston Freedom Festival July 4th. Their next performance will be July 1 at the Miller Outdoor Theater Aug. 24.

"It's kind of nice after a hard day in the space business to go down to this place with these people whose sole goal is to harmonize together," Branscomb said. "We're not concerned with who we are or what we do, we're only concerned with our company and our community.

"You go there and you forget about everything that happened during the day," Erickson agreed.

Erickson's been a member of the Tidelanders for 30 years. Branscomb for 18. It's an addictive hobby, they said.

"The style of harmony is arranged in such a way that it makes a very complete musical sound with just four voices, and it gives you a thrill when the sound of the whole is so much more than just the individual voices," Erickson said. "First-time listeners are always amazed at the fullness of the sound, a sound that seems like so much more than you'd expect to hear from just four people."

"Barbershop style focuses on separating music into individual parts for everyone. It's a way to harmonize with each other, to make music more than just music," Erickson explained.

"You guys on the other side of the world, you've got to recognize that we live in a world of space," Branscomb added. "We've got to communicate in a more human way, to learn to understand one another, to speak not just in space."
**Giltrud Center News**

**Defensive driving—**Course is offered from 8 a.m. to 5 p.m., Aug. 10, Sept. 21, Oct. 12, Nov. 16 and Dec. 10. Cost $24. Just past the Thermochemical Test its annual luncheon meeting at 11:30 a.m. Monday, July 17 and 18; non-members $5, members, $3. The keynote speaker will be NAPA Department Administrator J. R. Thompson with information about Marketing Services. Program is also open to anyone interested in automotive business. Cost is for the dinner buffet and program is $10 and $12 for members and non-members. For more information, contact Sharon Westerman 486-8972 by July 19.

**Saturday**

**The Lorul Raneous Room**

Friday and Saturday nights will be held at 8 a.m. July 20 at the Gilruth Center. Entry fee is $15. The Lorul Raneous Room is open to all persons with an interest in microminiaturization. Door prizes and other special features will be available if the race (not a.m. Tuesdays addition Ave B from 2nd Stre.

**BAPCO meeting—**The Bay Area PC Organization (BAPCO) will meet at 7:30 p.m., July 23, at the League City Bank and Trust, 303 E. Main St. The meeting is open to persons with an interest in microcomputers. Contact Mike Kellis at x34807, or Tom Kelly, 995-5019, for information.

**Cafeeteria menu—**Served: meatballs, pirogies, chicken and onions, deviled crab, dressed steak with beef dressing. Soup: seafood gumbo. Vegetables: mixed vegetables, peas, cauliflower.

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**Wednesday**

**BANK meeting—**The Bay Area NAFSE (National Association Female Executives) Network will have its 2nd annual meeting at 11:30 a.m. July 24 at the South Shore Harbour Country Club. Speaker will be Dan Pancoast, president of the South Shore Harbour Country Club Operations for the Houston Better Business Bureau. Speaker will speak about consumer and business fraud. Dinner buffet-programs $10 members, $15 non-members only 75 members, $5 non-members. To make reservations or for more information, contact Sharon Westerman 486-8972 by July 19.

**Sunday**

**Space station symposium—**The Symposium--For Computer Simulation Chapter meeting will be held at 11 a.m., Friday, Aug. 26 at the Ellington 3rd floor of The Base. Speaker will be Larry Tiner, a national expert in the field. No reservations required. Lunch will be available. For more information, contact Earl Rubenstein, 333-1116 or Robin Kirkham 333-7345.

**August 20**

**BANK meeting—**The Bay Area NAFSE (National Association Female Executives) Network will have its 2nd annual meeting at 11:30 a.m. August 28 at the South Shore Harbour Country Club. Speaker will be Steve Griffin, owner of Comedy Showcase, speaking on "Making Yourself Happy".

**Thursday**

**CBS smoked tri-tip, ensalada, turkey and dressing. Soup: chicken noodle. Vegetables: Lima beans, butternut squash & potato salad.**

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July 19, 1991

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Page 3

Space Exploration Initiative

Synthesis Group member discusses NASA's response to exploration report

(Editor's note: Doug Cooke, deputy manager of the Lunar and Mars Exploration Program Office, recently returned to JSC after a temporary assignment as a member of the Space Station Group. That group's report, "America at the Threshold: America's Space Exploration Initiative," set forth four possible architectures. 14 technology initiatives and 10 policy recommendations that could shape space exploration and exploitation for the next half-century. This is the second part of the interview.)

By Kelly Humphries

Q: How will NASA formulate its response to the Synthesis Group report?

A: We're getting ready to kick off a study of the architectures with the other centers. We've got to spend quite a bit of time fleshing out the architectures to make sure we fully understand their impacts and implications. They're written at a fairly high level in the Synthesis report. We plan to accomplish this by getting our supporting centers and organizations to develop implementations for the architectures. They'll define what it will take in terms of vehicles, number of flights, planet surface systems and all other aspects of the management of long-term timelines and engineering studies. Also, the architectures will look at possible options and alternatives that might be more efficient ways of accomplishing mission objectives. We will track those options and when we report back, we'll describe which mission options are attractive. It may lead to some evolution of the architectures described in the report.

The US Space Commissions and their relative merits in terms of what they accomplish versus what they need to imply in terms of number of flights and the scope of the program. We'll compare the architectures against each other, but we'll also evaluate potential options and their relative merits. Finally, we will be working on what we think our recommendations are.

That's how we plan to assess the architectures, but we'll also be looking at the technologies that are described in the report and comparing them with the NASA technology programs to make sure that we're going down all the right paths. Right off the bat, I have to say that for the most part we're pretty close to being on those paths. We have recognized within NASA the importance of the technologies that are described in the report.

We are addressing the recommendations, as well. Some of those, such as creating a national program office, naming an associate administrator and having an executive order that lays out this national program office are beyond our purview and will be addressed at the headquarters level.

Right now we have four architectures. At some point, we'll have basically one architecture with possible options. There will still be things that we don't fully understand, so, we'll have studies and technology and research programs that bring in data downstream where we can decide on specific options.

What we found was that when you try to define architectures that are different from each other, they tend to vary in about three parameters. One is the degree to which scientific exploration and exploration are pursued. Another is human presence, crew size and accomplishments. We'll set the scope and scale of the activity and the logistics. The third one is the degree to which you pursue energy development, either for use in space or in supplying it to Earth. Those three things tend to drive the program.

There was an adjacent area of variability and that was the degree to which activities were emphasized on the Moon as opposed to Mars. You can fully develop your activities on the Moon and just go to Mars in an expedited fashion. Or, you can do the minimum on the Moon and try to really focus in on Mars exploration.

Q: Looking at this will be a NASA-wide effort, is the Lunar Mars Exploration Program Office going to be the "point man" for that?

A: We're leading all the architecture and technology studies. We have a Level I office at headquarters working closely with us in planning that work, making sure that we meet the milestones that they see and reporting back to Admiral Truly, Congress and the Space Council. We also have all the NASA centers involved in this. Our primary leads are what we call integration agents. One of them is here in the new Synthesis Office, the Planet Surface Systems Office headed up by Barney Roberts. We also have an integration agent at Marshall Space Flight Center that's responsible for space transportation. Langley is responsible for orbital nodes. One thing we've been looking at is how we might best use of space stations in these efforts or other possible nodes in orbit. Then we have JPL, which is our lead for robotic missions requirements.

Q: Will other agencies like the Department of Energy and Department of Defense be involved in the report follow-up work?

A: That's not settled yet. They offer a lot of experience in many technology areas. We have a memorandum of understanding signed with the DOE, and at headquarters they're working on one with DOD. Over the past two or three years there has been work done in conjunction with DOE and DOD on nuclear systems in particular.

Barney Roberts has worked with the Corps of Engineers in studying planet surface systems. But right now, before there are further policies established on collaboration with DOD and DOE, we're waiting until we see what comes out of the National Space Council response to the Synthesis recommendations.

Q: So, we have work ahead of us yet to go into more depth on this report. Can you sustain interest in the report's findings?

A: There's an important effort focusing on early achievements. First off, there are some missions laid out within NASA that will contribute to the knowledge needed to make the Mars program. We're also looking at other things we can do in the near term that will generate interest in this whole exploration activity. That involves space shuttle missions and space station development, as well as the Augustine panel's work and Steve Bailey's New Initiatives proposal for a utility lander for use on the Moon that scientists can develop payloads for. You could develop a production line for them, and they could go on relatively small expendable launch vehicles, but could carry a variety of payloads. He's looking at getting that developed in the near term so that it would be available soon for recording data. It's also something that's visible that captures people's interest.

Small projects like that can also help us find new ways of doing business, where there are trying to do is streamline the management process. You can use a small program like that as a pathfinder. The Exploration Space Initiative is ready to go, and it's going to be important to manage it efficiently. We have ongoing studies on the management process, as well. These things fit well with the recommendations of the Stafford report and the Augustine report.

One other important thing we're doing in parallel is laying out long-term plans and approaches toward accomplishing SEI, with decision points where technology, policy and study results feed into the decisions. We're developing long-term timelines and engineering studies that are somewhat independent of architectures.

And we're going to get the benefit of the knowledge that's already there. I was very impressed with the willingness of retired space experts who have gone on to other things, to come in and talk, and talk to the people who are doing this now. And we're going to get that benefit in this effort. That way, we have both the benefit of new ideas as well as past experience so we can avoid the same mistakes.
Soviet inspect JSC facility

(Continued from Page 1) A former Chicago and Iowa general director of the Energia Scientific and Industrial Association, Anatoly L. Makarinovsky, assistant to Semenov; Anatoly I. Kislanyk, director of Khronshchuk Machine Building Plant, the developer of the Proton launch vehicle; Leticia C. Bohn, director of Space Devices Scientific and Technical Association which builds remote sensing satellites; Andrey I. Gilevich, general director of the

The video is sponsored by the National Board of Boiler and Pressure Vessel Inspectors. Presentations will be at 1 p.m. Monday in Bldg. 350, Room 130; 9 a.m. and 5 p.m. Tuesday in Bldg. 226 North; 2 p.m. Wednesday in the second floor conference room of Boeing, 18648 Buccaneer; 9 a.m. Thursday at Loral Aerospace, 1816 Airport Blvd.; 10 a.m. and 2 p.m. Thursday in Bldg. 273 at Ellington Field.

Test conditions on Moon

By Billy Deeson

Working in the lunar construction shop mockup, a team of architects and engineers last week ran through a typical work day simulation for the future crew that would build a permanent lunar base.

Members of the Man-Systems Division and other organizations working on lunar base designs documented general housekeeping and operations tasks for a six-person crew in a computer program specially designed for the simulation. Three computers inside the habitation module provided the day’s timeline and communications capability between the mockup and team members in Bldg. 15.

“The lunar habitat module is divided by work functions into zones,” said Nathan Moore, lead of the four-man team that designed the habitation module last summer. “Each one of the crew quarters for six can be closed off by sliding doors so part of the crew could sleep while others worked on an around-the-clock shift schedule. The living area has wardrobes, galley, health care, exercise, hygiene, waste management and shower facilities. At the other end of the module is the working area and lab, complete with computers and robotics and maintenance work stations.

The architectural mockup is fairly low in fidelity and does not have much working hardware, the team simulated several operational work tasks, said David Gutierrez, a Johnson Engineering architect/habitability engineer and member of the Man-Systems Division.

“arid we did include some work assignments using computers to communicate with our office in Bldg. 15 to simulate both voice and data transmissions,” Gutierrez said. “We reported status of various systems and responded to several inquiries for data from Bldg. 15 which acted as a command and control center.”

An actual breakfast and lunch prepared by the Man-Systems Food Lab staff, brought realism to the simulation.

“We baked bread during the day, and by the time it was ready, we were really getting hungry,” Gutierrez said.

“We wanted to get data and feedback from the participants about the work space design. Because of the early stage of the design, we limited our interest to basic architectural needs: user volume, crew circulation and reach envelope. We need to know how the module design satisfies the actual free-volume requirements for six people to feel comfortable and be able to reach and manipulate the equipment and tools they would use everyday.”

The architects also will use the information from this study to establish a format for evaluating the mockup.

“We need to look at basic human factors such as crew accommodation needs within a module as early as possible in an architectural design so we can improve both our design and our evaluation process,” Gutierrez said.

Gutierrez noted the six-person evaluation team participated in the last hour of the simulation for a study of crew changeover.

The two evaluation teams conducted end-to-end simulated exercise and the relief crew spent a short time exercising and working in the gallery-wardroom area so they could provide additional feedback about the simulation.

At day’s end, each of the 12 team members was asked to complete a 40-question survey to compliment comments gathered throughout the simulation.

“About half the respondents are in and I expect the others in a few days,” Gutierrez said. “Our final product will be an illustrated paper with an accompanying videotape outlining our findings — good, bad or indifferent.

The goal here is to learn from all comments and see if we can improve the mockup at a low of fidelity. Our plan is then to review this information and outfit the wardroom a little better. This study gives us a guide about where to go from here.”

Area graduates exposed to life sciences research

Three Houston high school graduates are getting some hands-on experience and exposure to NASA research this summer in the Space and Life Sciences Directorate.

Each year the directorate awards three summer internships to students demonstrating academic excellence in the sciences. Graduates are selected as contestants in the annual Science Engineering Fair of Houston. Interns are to expose the students to space research and spark an interest in continued work in the field after college.

This year the interns are Leo Jwo of Clear Lake High School, Phillip Scales of McCabe High School and Tammy Morris of Gal-Fair High School.

Jwo is working in the directorate’s Laboratory for Standard Interface reprogramming. He plans to attend Rice University in the fall, majoring in

MCC, cafeteria set STS-43 hours

The Mission Control Center viewing room will be open to budgeted JSC and contractor employees and their families for special times of STS-43.

Based on a Tuesday launching schedule, the viewing room will be open Wednesdays, 11:30 a.m. - 2 p.m. and 5-7 p.m.; Thursday, 11:30 a.m. - 2 p.m. and 5-7 p.m.; July 26, 11:30 a.m. - 2 p.m. and 5-7 p.m.; July 27-28, 11 a.m. - 5 p.m.; July 30, 11:30 a.m. - 2 p.m. and 5-7 p.m.; July 31, 11:30 a.m. - 2 p.m. and 5-7 p.m.

Hours may be altered for mission operations, check the Employee Information Service, x36765, for updated hours.

No children under the age of five will be admitted.

Also during STS-43, the Bldg. 3 cafeteria and 11 cafes will have special hours.

Weekdays, except for launch day, the Bldg. 3 cafeteria will be open from 7 a.m. to 4:30 p.m. and Bldg. 11 from 6:30 a.m. to 2 p.m. Saturdays and Sundays, Bldg. 3 will operate from 11 a.m. to 4:30 p.m. and Bldg. 11 from 7 to 10 a.m.