MGS images suggest liquid water sources on Mars

Numerous deep channels descending a Martian crater wall, and the debris they left behind, are seen in these images taken by the Mars Global Surveyor camera. The boxed area in the left image is enlarged at right. Sunlight illuminates the scene from the upper left. The channels and the debris areas look sharp and there are no small meteor impact craters on them, suggesting that these features are extremely young relative to the 4.5-billion-year history of Mars.

"(The gullies) could be a few million years old, but we cannot rule out that some of them are so recent as to have formed yesterday," Malin said. Because the atmospheric pressure at the surface of Mars is about 100 times lower than it is on Earth, liquid water would immediately boil when exposed at the Martian surface. Investigators believe that this boiling would be violent and explosive. So how can these gullies form? Malin explained that the process must involve repeated outbursts of water and debris, similar to flash floods on Earth.

"We've come up with a model to explain these features and why the water would flow down the gullies instead of just boiling off the surface," Edgett said. "When water evaporates it cools the ground—that would cause the water behind the initial seepage site to freeze. This would result in pressure building up behind an ice dam. Ultimately, the dam would break and send a flood down the gully."

The occurrence of gullies is quite rare: only a few hundred locations have been seen in the many tens of thousands of places surveyed by the orbiter camera. Most of are found in the Martian southern hemisphere, but a few are found in the north. "What is odd about these gullies is that they occur where you might not expect them—in some of the coldest places on the planet," Malin indicated. "Nearly all of them occur between 30° and 70° latitude, and usually on slopes that get the least amount of sunlight during each Martian day. If these gullies were on Earth they would be at latitudes roughly between New Orleans and Point Barrow, Alaska, in the northern hemisphere; and Sydney, Australia, to much of the Antarctic coast in the south.

The water supply is believed to be about 100 to 400 cubic meters (about 330 to 1,300 feet) below the surface, and limited to specific regions across the planet. Each flow that came down each gully may have had a volume of water of roughly 2,500 cubic meters (about 90,000 cubic feet)—about enough water to sustain 100 average households for a month or fill seven community-sized swimming pools. The process that starts the water flowing remains a mystery, but the team believes it is not the result of volcanic heating. "I think one of the most interesting and significant aspects of this discovery is what it could mean if humans ever go to Mars," Malin said. "If water is available in substantial volumes in areas other than the poles, it would make it easier for human crews to access and use it—for drinking, to create breathable air, and to extract oxygen and hydrogen for rocket fuel and to be stored for use in portable energy sources."

JPL has demonstrated a new voice-activated, digital human-image animation system that uses language to generate digital facial movements. The system uses the smallest units of speech, called phonemes, to manipulate a person's facial movements in an image. While development is in the early stages, the eventual result will be photo-realistic animation of any human face appearing to be speaking naturally.

"This is voice-driven, so the image morphs in response to a voice or equivalent input," said principal investigator John Wright of the Visualization and Earth Sciences Group in Section 388. "Real-time animation is a key step in our development process."

The system, called Digital Personnel, will be developed with Graphco Technologies Inc., New- ton, Pa. The company said the system will enable virtual person- nel for commercial applications in numerous markets, including web-based customer support with user-friendly speaking inter- faces. Graphco also projects that video telephones, broadcasting, distance learning, video games and motion pictures will also create significant demand for the technology.

Other applications of the system might include product demonstration, promotion and celebrity representation interaction with online customers.

Wright is working in collabora- tion with fellow group member Dan Peters. The technology is a spinoff of a task developed from 1993-95 at JPL for the U.S. government called Automated Speech Visualization. Wright credited JPL employees Ken Scott, Steve Watson, Dave Kopek, David Freda and Kevin Hussey with the success of the original technology. Although the technology can be demonstrated today, Wright said Digital Personnel's commercial applications are 12 to 15 months away. He noted that possible medical applications might include helping the hearing impaired to read lips and to speak by showing how the system simulates mouth and facial movements.

JPL's Commercial Technology and Regional Economic Develop- ment Program arranged the transfer of Digital Personnel to Graphco, which recently acquired the rights to the patent-pending technology. The license was originally issued by Caltech.
Teenager wows rocket scientists

By Gia Scafidi

There she stood presenting her research entitled “Sailing into Space—Reflecting on a Solution,” in the midst of more than 100 veteran rocket scientists at the Advanced Propulsion Solutions when needed. The JPL’s and Caltech’s amateur radio club traditionally supports Lab Security

Records Section

Job Fair—JPL open positions in software and information technology will be spotlighted from 4 to 8 p.m. on June 29 at the JPL Hang Gliding Club—Meeting at Building 126 in Building 126-346. JPL Toastmasters Club—Meeting at 5:30 p.m. in the Building 167 conference room. Guests welcome. Call Mary Sue O’Brien at ext. 4-5090.

Wednesday, July 5

Associated Retirees of JPL—Meet at 11 a.m. at the Caltech Credit Union, 528 Foothill Blvd., La Cañada.

Thursday, June 29


Wednesday, July 5

TOPEX sees end of La Niña

After dominating the tropical Pacific Ocean for more than two years, according to the latest JPL data, a “cool pool” is continuing its slow retreat. The system seems to be retreating from the climate stage, according to the latest satellite data from the PL-managed U.S.-French TOPEX/Poseidon mission.

These data, taken during a 30-day cycle of collection ending June 8, show that the equatorial Pacific continues to cool and is returning to near to as last, persistent, two-year La Niña system. With the end of the only a few patches of cooler, lower sea levels remain across the tropics.

In June 1999, La Niña barely had a pulse, but was resuscitated last fall. It appears that the global climate system is finally emerging from the past three years of dramatic swings from the extra-large El Niño of 1997/98, which was followed by two unusually cool and persistent La Niña years, according to PL scientists.

There were standing presentations on nearly every seat in the auditorium; nor was it surprising that she was small in stature. What was so remarkable was the fact that she was only 14 years old.

With a confident, intelligent air, this ninth grader from North Royalton, Ohio shared her recent discovery that plus or minus 35.26 degrees is the ideal tilt angle required to achieve maximum thrust of a solar sail. Through computer simulations using Navin’s laws of motion, Kepler’s laws of orbital motion and Euler’s method, this young scientist demonstrated her technique for estimating the trajectory of a solar sail utilizing gravity and sunlight influence the sail’s propulsion system. She concluded her presentation with a look at solar sails’ ability to hover continuously over planet plumes and function without fuel, a task which rockets cannot perform.

“The conference wasn’t intimidating at all, just a little nerve-wracking,” Ulyana said. “This hasn’t sunk in yet; it’s pretty overwhelming.”

And understandably so. In the past several months, Ulyana has made leaps and bounds in the science world. She placed first in the Northeastern Ohio Science and Engineering Fair’s Earth science category (against all boys) and placed second in the United States at the International Youth Science Forum in London this summer. According to her father, “We’re very proud of her,” said her father.

“We’re also a little worried thinking about her future, given that she’s only 14 years old. We’re praying that she will continue working on solar sails, broadening her horizons to discover more about the effects of different sail shapes and various steering strategies.”

“We’ve very proud of her,” said her father. “We’re also a little worried thinking about her future, given that she’s only 14 years old. We’re praying that she will continue working on solar sails, broadening her horizons and influencing the sail’s propulsion system.”

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“They didn’t have anywhere to hide. They only had help from her two older brothers, her father, and various scientists.

Charles Garner, senior engineer in JPL’s Small Gossamer Systems Group, provided Ulyana with information about solar sail’s orbits and actual materials for making her sails. “Oh, I just thought she was outstanding,” said Garner. “She’s so smart. Real Society and first as the U.S. Army in the Earth and Space Division.

Ulyana’s next stop was the junior Science and Humanities Symposium’s regional competition in Ohio, where she received a first place $4,000 scholarship and advanced to the nationals in Washington, D.C. There, her research was put in the Engineering and Computer Science category (against all boys) and placed first. She was awarded for her research and was one of eight students chosen to represent the United States at the International Youth Science Forum in London this summer. Her research was also named the best Earth science category (against all boys) and placed second in the United States at the International Youth Science Forum in London this summer. Her research was also named the best Earth science category.

“You can definitely say it’s been a hectic spring,” said Horodyskyj’s father. “It was a very busy year and a half in advance of the event.”

Parking area, road closure noted approximately two months. Operations on the hill will be curtailed. Permits for private photo engagements, family portraits, etc. will be spotlighted from 4 to 8 p.m. on June 29 at the JPL Hang Gliding Club—Meeting at Building 126-346. JPL Toastmasters Club—Meeting at 5:30 p.m. in the Building 167 conference room. Guests welcome. Call Mary Sue O’Brien at ext. 4-5090.

Thursday, June 29


Wednesday, July 5

Associated Retirees of JPL—Meet at 11 a.m. at the Caltech Credit Union, 528 Foothill Blvd., La Cañada.

Thursday, June 7

JPL Gun Club—Meeting at Building 183-328.
You've been at JPL for more than a year now. It's been quite an eventful time, has it not?
A That's an understatement. The real possibility of severe budget cuts in 1999; the two lost missions to Mars; the subsequent multiple press conferences and investigations—the combination of all these events and activities placed considerable stress not only on people at the Laboratory but on our image as well. And because these stories played out over extended period of times, we were largely in a reactive mode. I am accustomed to proactive stances. That's what we're hard at work on now.

**Question**: How so?
A By consolidating our communications efforts and building infrastructure. As everyone knows, our slate of missions ballooned in the '90s; however, money and effort being spent on communicating with the public was being cut into thinner slices of the pie. Clearly, we have a far better chance of reaching more people with our messages in a meaningful way if we coordinate. That's why we created the Office of Communications and Education, and that's why we have merged under a virtual roof the outreach, public affairs and educational communities. But consolidation is only half the battle. We now have to begin reshaping our messages in an even more accessible way so that people can better absorb and relate to them.

**Question**: For example?
A First, we have to think about our communications activities as stories. Our missions are grand adventures full of considerable risk and sizeable rewards. They are also science detective stories. People love these kinds of stories. And good stories last a long, long time. I just look at Homer's Odyssey. And if a picture is worth a thousand words, imagine the megabite impression that an animated digital image can have. Good stories, great visuals. Only one ingredient is then missing: people. If we want to connect with the public, we have to put more of a human face on our missions, especially if we want to attract younger people, as we need to do.

**Question**: OK, this sounds like packaging. What about content?
A The content is our great, great strength. Content equals destination—and that's another reengineering project. We're renovating. We intend to give the content teams based upon five themes—Solar System, Earth, Mars, Universe and Technology—that bring different skills to the table. But calling a team a team doesn't make it a team. We're like an expansion team, to use a sports analogy. I don't think we'll win the national championship in our first year, but I'm expecting a winning season. Critical to making this work are our five theme leads—Anita Sohus for Solar System, Marguerite Syvertson for Earth, Michelle Viotti for Mars, Jane Platt for Universe, and Alice Wessen for Technology. They've taken on a big leadership role in coordinating all these various activities. They need all the support the Lab can give them.

**Question**: What's been the reaction from the projects?
A Some managers saw the logic and necessity from the get-go; a few have been slower in warming up. I got some really good advice not long ago. "You gotta go out and press the flesh with the project managers," I was counseled. It's not unlike the plumber who has a leaky faucet at home. As a communications manager, I've got to do a better job of communicating.

**Question**: What are you saying to them?
A My message is simple. The consolidation effort intention isn't about taking something—dollars, people, control, whatever—away. It's really about giving the project more of what they—and all of us—ultimately want: more meaningful awareness by the American public about our missions and their purpose. I haven't gotten anything but a positive response when the consolidation is framed that way. Part of it, frankly, is learning how to communicate in JPL's own language. If you talk about "partnerships" you can see some people's eyebrows raising. Turn that around and translate the word partnership into a word we learn when we get there. People are fascinated, just like we are, are there maybe for different reasons, with our destinations. Space is an example of what marketers call being pre-sold. All you have to do is say the word "space" and people stop what they're doing to listen. I think we can build on these inclinations by putting our destinations in the foreground of all of our communications activities. Then let's tell them about all of our remarkable machines, instruments and science. This strategy will work in every communications medium for every place we explore. Planets. Comets. Asteroids. Moons. Galaxies. And the Earth itself. You name it. People can't get enough when it comes to our destinations.

**Question**: Back to the consolidation. How is it going?
A Not as fast as I would like. Six months ago, just four days after the loss of Mars Polar Lander, we lost our just-named Outreach Manager in the just-forming Outreach Office to a dot.com company. That set us back. But we're pretty much back on track. Kim Shepard has stepped up to be the acting Outreach Manager. Dr. Parun Kassiaie has recently joined us as the Education Manager. Frank O'Donnell has just hired four new media relations specialists in the Media Relations Office. And, of course, there was moving all of the full-time outreach group into our new organization. That's a lot of activity. We've now set up integrated communications teams based upon five themes—Solar System, Earth, Mars, Universe and Technology—that bring different skills to the table. But calling a team a team doesn't make it a team. We're like an expansion team, to use a sports analogy. I don't think we'll win the national championship in our first year, but I'm expecting a winning season. Critical to making this work are our five theme leads—Anita Sohus for Solar System, Marguerite Syvertson for Earth, Michelle Viotti for Mars, Jane Platt for Universe, and Alice Wessen for Technology. They've taken on a big leadership role in coordinating all these various activities. They need all the support the Lab can give them.

**Question**: But you're not a fan of acronyms?
A A couple of people have told me it takes two full years to get JPL's internal content code down. Acronyms are not time-saving devices in the long run. And they have a funny way of spreading from identifying procedures and departments to becoming even the names of spacecraft. Unless you're IBM or AT&T and you plan on being around for a long time and spend millions of dollars in advertising—you're not going to be very effective with the public by using acronyms. Initials work best as monograms on your clothing—because hopefully you already know who you are.

**Question**: Why are you such a big proponent of the Internet?
A What radio was to the generations of the '30s and '40s, what television was to the generations of the '50s through the '90s, the Internet will be for our children. Only in this case, the future is already here. You could put all your outreach money and effort into an Internet communications bucket and you still won't be able to keep up with its potential.

**Question**: What's going on with the von Kármán museum?
A That's another reengineering project. We're renovating. We intend to give visitors a more thorough impression of the Lab's activities based upon our five themes. Up to now it's been a hodge-podge of throwing into the space whatever exhibits were available at any given time. We're going to change that.

**Question**: What has it been like coming from public television to JPL? Big sea change?
A There are interesting similarities, actually. The headquarters/field center dynamics are similar. The big difference is scale of resources. KCET had an operating budget of less than $50 million. JPL is a billion-dollar-plus enterprise. I keep reminding myself of that. Because if we really pull our resources together, the impact we can have is nothing short of extraordinary.
Lab enjoys Heritage Week

Some Rosin from JPL's
Big Band Thrive; Bray, Chris Woodcock, Lex Deutsch, Leslie Olander, and Al Basin cooperate during American Heritage Week last week. Right: Naivasha tribe members perform a traditional dance.

Letters

On behalf of myself and my husband, I would like to send a thank you to all of our friends who supported us over the years here at JPL, through good times and bad. There was a lot of fun and a lot of adventure.

We are looking forward to our new adventures back in England, but will always remember the joy and support of my family and friends while I was at JPL there was just absolutely nothing like it.

Linda Robeck (and Don Fullum)

I wish to thank all my friends, co-workers and supervisors who gave me support as I took the difficult step of retiring from JPL, for the sympathy after my father’s passing and to the ERC for the beautiful place they turned JPL’s Play Fair into.

Marilyn Giandomenico, 14 years, Section 1272

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