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Tom Wynne / JPL Photolab

STORM CHASER

DEB VANE TALKS ABOUT HOW CLOUDSAT BECAME A CRITICAL ELEMENT IN HURRICANE STUDIES

By Mark Whalen

As the hurricane season comes upon us, JPL's CloudSat mission is providing an unexpected bonus for trackers of those violent storms. CloudSat, launched in April, flies approximately 700 kilometers (435 miles) over the Earth's surface in its mission to create the first global survey of cloud properties that are critical for understanding clouds' effects on both weather and climate. Project manager and deputy principal investigator Deborah Vane discusses the new look in cloud research.

How is CloudSat making an impact this hurricane season?

Before we launched CloudSat we thought, "Wouldn't it be fantastic if we ever fly over a hurricane and see what it looks like?" We thought we'd be lucky to fly over a hurricane. Well, it turns out that we fly over hurricanes all the time. And we've even flown directly over two hurricane eyes.

CloudSat flew over Typhoon Prapiroon in the South China Sea in early August. Our data showed that the eye of Prapiroon was not empty, but instead seemed to show some convection in it. We showed this to a hurricane researcher, and he said, "That's fantastic! Give me more overpasses!" The next pass over the eye of Typhoon Ileana, also in the China Sea, in late August, showed a completely different eye structure. The differences are, of course, interesting to hurricane researchers, and we hope to get more overpasses for them to study. Understanding the vertical structure of these storms is one of the most challenging problems in hurricane research.

To the untrained eye, CloudSat images look very similar to those of other satellites. What is different about CloudSat?

CloudSat data actually looks quite different than data from other satellites. The difference is that, with CloudSat, you're seeing a side view of clouds, basically a cross section, instead of seeing the top layer.

For example, when you see a typical image of a hurricane from space, you can't tell that under the top layer of clouds there are great variations in what's taking place. In some locations there is tremendous rainfall, while in other areas there is none. The activity under the cloud top varies greatly from place to place. CloudSat detects these differences, both in the cloud vertical structure and in the location and intensity of the precipitation. The vertical structure of the clouds, including how much water is contained in the cloud layers, drives the intensity of the storm. The fuel for a hurricane is the warm ocean waters, but the furnace for the storm is the clouds. We need to understand the complex dynamics and thermodynamics that propel these storms, and CloudSat helps us do that. Unfortunately, CloudSat is not everywhere at all times—it is limited to a nadir-only view beneath the satellite—but it shows us the potential of a cloud radar for a future operational system.

How is the CloudSat data helping researchers now, compared to what they used before?

We are compositing the data from all of our overpasses, and this data will be compared, statistically, to models of hurricane structure and with in-situ data collected from flights into these storms. The more passes we get at various life stages of hurricanes, the more information we can provide to researchers to test their hurricane models. Another advantage of CloudSat is that our data does not require a pilot to fly into a dangerous storm.

Why weren't hurricanes considered a target for CloudSat before?

We never thought specifically about studying hurricanes with CloudSat until we flew over Tropical Storm Alberto on June 12—that was the first tropical storm that threatened the United States. We thought, "Wow, weren't we lucky?" Alberto got us interested. Then we realized that hurricane overpasses were going to happen frequently. And we've even flown over an eye twice, which is something we thought might never happen. That's because CloudSat is always looking straight down below the spacecraft, so it can't be pointed at targets of opportunity, and we fly in an on-orbit formation with the other satellites of the A-Train, so we can't just change our orbit. From our post-launch experience, we've had multiple passes over hurricanes as they develop from tropical storms to hurricanes. This opens up new research that can be done with CloudSat data. Unfortunately, tornadoes are too small and too short-lived to be captured by CloudSat.

" . . . Well, it turns out that we fly over hurricanes all the time. And we've even flown directly over two hurricane eyes."

Is CloudSat making an impact outside of the United States?

Yes. Our science team is international in membership. The Europeans, the Japanese and the Canadians are all involved in applying CloudSat data to problems of weather prediction and climate research.

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From left: JPL Director Charles Elachi, Zdenek Sekanina, Olga Kalashnikova, Michael Janssen, Samuel Gulkis, Chief Scientist Daniel McCleese at JPL ceremonies Sept. 1. Kalashnikova received honors in July from the Russian Academy of Sciences.

TOP HONORS FOR RESEARCHERS

Ceremonies held earlier this month recognized recent significant accomplishments by several JPL researchers.

Samuel Gulkis, from the Astrophysics and Space Sciences Group, and Michael Janssen of the Cosmology Group, are part of the team that was honored for their groundbreaking studies confirming that the universe was born in a hot Big Bang. The pair were members of the Cosmic Background Explorer science team, which was awarded the 2006 Gruber Cosmology Prize. The team earned a gold medal and a $250,000 prize.

Also, astronomer Zdenek Sekanina was a recipient of the Nusl Prize for 2006. The prize is the highest award conferred by the Czech Astronomical Society to scientists for exceptionally significant lifelong contributions to astronomy.

Both awards were bestowed at the International Astronomical Union's general assembly in Prague, Czech Republic, in August.

The Cosmic Background Explorer was "amazingly difficult but it worked beautifully, thanks to a brilliant team of scientists and engineers, and it changed cosmology forever," noted John Mather of the Goddard Space Flight Center, who was the mission's project scientist and now serves as senior project scientist for NASA's James Webb Space Telescope. "When we started in 1974, cosmology was very speculative. Now it's extremely quantitative, and we can answer questions that nobody had ever asked before."

The Cosmology Prize of the Peter Gruber Foundation recognizes individuals who have contributed to fundamental advances in the field of cosmology. The purpose of the prize is to acknowledge and encourage further exploration in a field that shapes the way we perceive and comprehend our universe.

The mission, built by Goddard and launched in 1989 to measure microwave and infrared light from the early universe, determined that the cosmic microwave background, which is essentially the afterglow of the Big Bang, has a temperature of 2.725 +/- 0.002 Kelvin, or about minus 455 degrees Fahrenheit. This observation matched the predictions of the hot Big Bang theory extraordinarily well and indicated that nearly all of the radiant energy of the universe was released within the first year after the Big Bang.

Gulkis is currently the principal investigator of the Microwave Instrument for the Rosetta Orbiter experiment, which is under development by the European Space Agency. Janssen currently is a scientific investigator on the Cassini, Rosetta, Planck and Juno missions.

Sekanina's award is named after a longtime chairman of the Czechoslovak Astronomical Society, Professor Frantisek Nusl. There is no more than one recipient per year. Since 1999, the Society has awarded the Nusl Prizes to Czech scientists who have made an outstanding contribution to the development of astronomy.

Sekanina's research has focused on comets and other minor objects in the solar system, both in the former Czechoslovakia and later in the United States at the Smithsonian Astrophysical Observatory of Harvard University and at JPL since 1980. At age 70, he is the youngest scientist to receive the award since it was reinstated after a 50-year hiatus as a lifetime achievement award.

vane

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You've been the CloudSat deputy principal investigator all along and were just named project manager. Overall, how long have you been involved with the mission?

Well, I go all the way back to the project's beginning. I was the proposal manager, working in partnership with the principal investigator, starting in 1992. We spent a number of years working on the proposal before it was selected by NASA.

When it came time for the implementation of the mission—the first three phases—Tom Livermore was brought in to manage the project. He was a great manager; he did a fabulous job of guiding us through the perils of hardware development, testing and the launch. Now that we're in the operations phase, the activities are focused on collecting, analyzing and applying the science data. I'm really delighted to be the project manager and to see this project from inception to completion.

How did CloudSat come about?

The idea came from the Global Energy and Water Cycle Experiment, under the World Climate Research Programme. Mous Chahine of JPL, who is also the Lab's former chief scientist, was the chairman of the experiment's scientific panel, and I worked as his scientific assistant for many years. The panel called for better observations of clouds to improve weather and climate models. The technology for a cloud radar was just emerging as a technique that might be implemented for space applications, and JPL was involved with a Canadian industry partner in developing the technology modifications necessary to implement a space-qualified radar. So I was positioned at the right place and the right time to bring JPL hardware experts together to meet an internationally-identified science need. And when NASA announced the first opportunity for proposals to the Earth System Science Pathfinder Mission Program, professor Graeme Stephens, who was also involved in the Global Energy and Water Cycle Experiment, was perfectly matched as the CloudSat principal investigator.

What were you doing prior to CloudSat?

Prior to CloudSat and my work with Dr. Chahine, I worked with Jim Graf on a series of studies that led to the Earth Observing System. Before that, I was a member of the Viking Lander Imaging Team fresh out of college.

What kind of work were you looking for after Viking ended?

Well, I went back to Martin Marietta in Denver for a while to look for other positions, but I loved JPL and California, so I also looked for openings at JPL. Dave Norris and John Wellman offered me a position in the Infrared Instruments Section.

So that's my history at JPL—I've been here almost 30 years. That's a sobering thought, but it's been a thrill in every way. I hope to see the CloudSat radar approach transitioned to an operational system before I eventually retire from JPL.

Lab's Constellation efforts reviewed

By Mark Whalen

Jeff Hanley, NASA's Constellation Level II Program Office manager, paid a visit to JPL Aug. 15 to meet with key staff who are leading efforts within Constellation.

Constellation will develop NASA's new human spaceflight spacecraft and launch system, which as part of the Vision for Space Exploration will take astronauts to the moon, Mars and beyond. The program will develop launch and Earth departure vehicles, landers and other systems. The first human-occupied launch of the crew exploration vehicle Orion, using the new Ares-1 launch vehicle, is scheduled for 2014.

Hanley was joined by his deputy, Mark Geyer; Brenda Ward, assistant for integration; Marsha Ivins, representing the NASA astronaut office; and Skip Hatfield, Orion project manager.

"It was important for them to view the ideas, energy and spirit of the Lab community," said Exploration Systems and Technology Office Manager Mike Sander, who leads JPL's efforts in support of NASA's Exploration Initiative.

The quintet was briefed on JPL's capabilities in project formulation and support; flight and ground software; end-to-end information systems; surface systems and operations; and recent advances in navigation.

"You guys go through the whole project lifecycle here and your ability to contribute is tremendous," Hanley told a meeting of JPL stakeholders.

Sander said the group was "impressed and excited by the amazing Mars science data they were shown by Fuk Li, as well as the marvelous capabilities the Mars Program Office has put in place and their approach to formulating the program. It's a clear indication there will be heavy involvement for JPL as the Mars strategy begins to unfold."

The group also showed keen interest in JPL's experience in meeting the challenges of developing multiple missions concurrently, Sander said. They were also "intrigued" by JPL's approach to ground and flight data systems and asked how that might be leveraged for Constellation, he added.

The group's tour included a close-up view of the All-Terrain Hex-Legged Extra-Terrestrial Explorer robotic vehicle. JPL leads the team developing the rover, which is intended to traverse over rough terrain to aid robotic or human missions on the moon.

"They found Athlete to be a clever development with clear potential applications to lunar exploration," Sander noted.

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Jeff Hanley

The next milestone, Sander said, is a major program-level, system-requirement review at the Johnson Space Center in September and October.

Hanley told JPL stakeholders he hopes to have a lunar architecture team in place by December. "Don't be shy about bringing us good ideas; we don't have time to let them percolate long," he said.

"The key is that JPL is now involved in Constellation," Sander said. "We are making an important and appreciated contribution to Level II systems engineering activities, and will be working toward involvement in the lunar phase with specific deliverables."

New public affairs policies reinforce openness

NASA and JPL have adopted new public affairs policies intended to reinforce the agency's commitment to openness.

"I'm very proud of the role JPL played in creating this policy," said Blaine Baggett, JPL's executive manager of communications and education, who served along with Dr. Charles Elachi on the committee that drafted the document. "Basically this is a recommitment to the free and open exchange of information about discoveries from our missions."

The NASA policy was originally announced by NASA Administrator Mike Griffin last spring. It was recently formally adopted in a revision part 1213 of title 14 of the Code of Federal Regulations and is titled, "Release of Information to News and Information Media." JPL's equivalent, which was adopted at the same time, is nearly identical but makes some language and formatting changes due to JPL's status as a Caltech unit and also to fit the JPL Rules system.

The committee that created the new policy was formed by NASA Headquarters after a controversy earlier this year involving Dr. James Hansen of the agency's Goddard Institute for Space Studies in New York City. At the time, Hansen charged that NASA Headquarters public affairs personnel were attempting to prevent him from interacting with the news media regarding his concerns about global warming.

The committee's deliberations were chaired by NASA Chief of Staff Paul Morrell and included representatives of many NASA Headquarters offices and field centers—particularly JPL and Goddard Space Flight Center, since they are specifically involved in science missions. Goddard was represented by center director Dr. Ed Weiler and public affairs deputy director Don Savage.

In addition to reaffirming the agency's commitment to openness, the policy also lays out the process for how scientific discoveries are turned into news releases and other public affairs products.

"The policy makes it clear that scientists are free to speak to the press about their work. The policy is also clear that NASA as an agency doesn't want to be in the scientific conclusion business—that's the responsibility of the science community," said Baggett. "A perfect example is the recent International Astronomical Union vote about Pluto. NASA's point of view is, 'The science community can determine how Pluto should be categorized. But call it what you will, NASA's in the business of going to interesting places like Pluto.'"

Baggett cautioned, however, that the policy doesn't mean NASA or JPL can issue news releases on every new science finding. "With a dozen and a half missions underway, we enjoy an embarrassment of science riches, but we have to be judicious about what will and will not make news. But that's different than sitting on information. We can always get information out, especially to selected audiences. That's the great advantage of our Web sites. And, of course, we are always here to help our scientists and engineers in translating their messages for the general public."

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CALTECH'S NEW LEADER VISITS LAB

Incoming Caltech President Jean-Lou Chameau toured JPL Monday, Sept. 11. Above, Chameau, second from right, looks on as Mars Reconnaissance Orbiter Project Scientist Rich Zurek points out a feature of the spacecraft. At left are Deputy Director Gene Tattini and Director Charles Elachi. Chameau received presentations from the Earth Science and Technology, Mars Exploration, Solar System Exploration, Interplanetary Network, Astronomy and Physics, and Business Operations directorates, and the offices of Human Resources and Outreach and Education. He also witnessed a Mars Reconnaissance Orbiter maneuver that placed the orbiter closer to its final mapping orbit.

Former deputy director Terhune dies

Charles Terhune Jr., a retired U.S. Air Force lieutenant general who served as JPL's deputy director for 12 years, died Aug. 31 at his La Cañada home at the age of 90.

Terhune graduated from Purdue University in 1938 with a bachelor's degree in mechanical engineering and also received a professional degree in aeronautical engineering from Caltech in 1941.

He was among the first officers assigned to the Air Force's newly created Western Development Division in Los Angeles in 1954, and served as the deputy commander for weapons systems. He also played a role in the development of command and control for space systems and in a predictive study on the future use of technology by the Air Force.

Terhune retired from the Air Force in 1969. He then served as manager for administration for National Cash Register's Electronics Division in Hawthorne. He joined JPL in 1971 as deputy director and retired in 1983. He earned several decorations and service awards in the Air Force and was awarded NASA's Distinguished Service Medal in 1982.

Terhune is survived by his wife, Glory, daughters Donna and Terry Lea, son Charles (Chuck) III, and grandchildren Debbie, Dawn, Doug, Jennifer, Amy, Laura and Charles IV.

Services were held Sept. 7 at La Cañada Presbyterian Church.

Passings

Jimmie McCurdy, 77, died June 2. He worked as JPL's payroll manager from 1969 until his retirement in 1994.

McCurdy is survived by his wife, Marilyn, and a son.

Philip Hagenburger, 85, retired from Section 664, died July 4.

Hagenburger worked at JPL from 1957 to 1982. He is survived by his wife, Miltreta, daughter Joyce Tewes and stepson Paul Hagenburger. Burial was at Forest Lawn, Glendale.

Pat Wilbur, 88, a retired contract administrator, died July 20.

Wilbur joined JPL in 1969 and retired in 1981. He is survived by three adult children and two grandchildren. Services were private.

Thomas Verbich, 48, an electrical test engineer from Section 341, died Aug. 5.

Verbich joined JPL in 1995 and had been on long-term disability. He is survived by his daughter, Alexandra, mother Marcia Porterfield and brothers Ted Verbich and Todd Koplock.

Burial was in Ohio. Rememberances are requested to Alexandra Verbich, 2065 Maverick Circle, La Verne, CA 91750.

Retirees

The following JPL employees retired in September:

Carl Sauer Jr., 54 years, Section 343M; Kim Leschly, 26 years, Section 8040; Stanley Soll, 22 years, Section 3824; Judith Podosek, 19 years, Section 3846.

Letters

After an amazing 20 years, especially the last 10 with DSN Outreach, my friends at JPL gave me an unforgettable sendoff on my retirement. Thank you so much to all who participated from the 900 Directorate, GAVRT, Goldstone, and from 180. Special thanks to Linda Lievense, Eve Zimmerle, Laura Cinco and Yvonne Samuel for organizing such enjoyable events. Thank you for the thoughtful gifts; I will certainly treasure them. I know I'm going to miss you all.

Shirley Wolff

I would like to thank all my friends at JPL for my retirement luncheon and the gift of the magnificent globe clock. It will have a special place on my desk at home. I would also like to thank the Heliophysics Advance Concepts Design Team for the award presented to me at the luncheon. It was quite unexpected. It has been a pleasure working with all of my co-workers during my years at JPL and I will miss the many challenges I faced in working on all the different proposals and advanced studies over the years. Thank you all again.

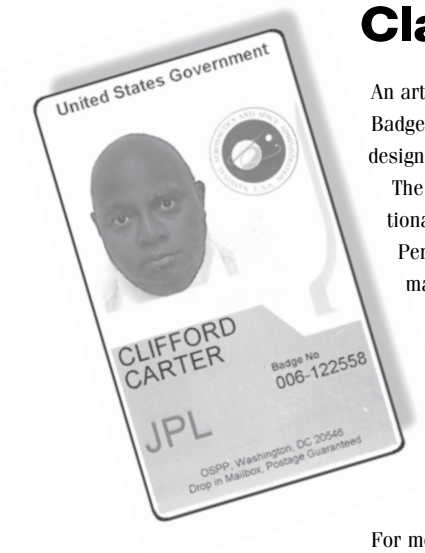
Carl Sauer

My wife and I would like to thank JPL for the lovely plant sent to us at the passing of her father. Your thoughts and support are truly appreciated. Sincerely,

Michael and Robyn Sierchio

We would like to thank JPL and the management of Division 37 and Section 372 for the beautiful flowers you sent us on the account of the birth of our son, Daniel Stefanini. We appreciate your thoughtfulness.

Heather and Mike Stefanini



Clarification: NASA badges

An article in the August issue of Universe about the new NASA badges at JPL requires clarification.

Badges colored red or orange designate foreign national personnel; red indicates the individual is from a country on NASA's designated country list, while orange badges are issued to those from non-designated countries.

The "LPR" on either the red or orange foreign national credential indicates that the individual, although a foreign national, is a legal permanent resident of the United States. Legal permanent residents are also often referred to as "U.S. Persons." Legal permanent residents may have access to International Traffic in Arms Regulations (ITAR)–controlled material.

JPL's Office of Export Compliance does not monitor the activities of foreign-born employees. It is responsible for determining technologies that are controlled under U.S. export laws and regulations. If "controlled" technology is to be transferred to a foreign national/entity, the office obtains the appropriate legal authority (licenses) to transfer the technology. Once a license is obtained, the office creates a technology transfer control plan to safeguard the transfer of controlled technology and protect other controlled technology from inadvertently being transferred.

JPL retirees will also receive new NASA credentials, and are urged to call the Office of Protective Services at 818-354-3536 for information and an appointment to acquire a new badge.

For more information about the badging process, log on to *http://protective-services.jpl.nasa.gov.*

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