Installation of a New Antenna Array on a P-3 Aircraft

BY NICK MOTT

Anyone that owned a TV before cable knows that fiddling with an antenna is no easy task. Supersize that antenna, multiply it by 15 and mount it on an airplane, and even an expert at getting television reception would be lost. When working with high-tech antennas, though, CReSIS engineers feel right at home.

In preparation for the 2011 Greenland field season, the CReSIS team made major structural and electrical changes to the antenna array on the P-3 aircraft.

The main changes took place on the MCoRDS radar system. The MCoRDS, or Multi-Channel Coherent Depth Sounder, penetrates kilometers into polar ice to chart the topography of the bed below. Rick Hale, Associate Professor of Engineering, describes the radar as an energy incident technique. Radar operators send out a chirped signal and record what comes back. The radar signal penetrates the ice surface, the intermediate layers, and the bed of the ice.

“It’s wizardry in signal processing,” - HALE

Preliminary changes focused on the structure and materials of the antennas and mounting systems. After observing the successes and downfalls of a radar system, Hale said, “you sharpen your pencils, and you do a little better job.” The new design, for example, limited metallic features that fasten the antennas in place. Metallic features interfere with the radar and skew the center frequency. The new alterations, which were made in a joint effort between the electrical and aerospace engineering departments, included changing bolts, fasteners, and other critical structural elements.

“I think we bought back about 10 db of performance just in changing the structural parameters,” Hale said.

The biggest changes, though, had to do with the antennas themselves. The CReSIS team, headed by Hale and Carl Leuschen, Assistant Professor of Electrical Engineering, designed and installed an array of fifteen antennas, almost double the size of last year’s array. When the P-3 reached the field, Leuschen said NASA members were impressed by the size of the array.

“They said as far as they know this is the largest antenna array they’d seen on a P-3 in civilian applications.” - LEUSCHEN

Leuschen said that the hard points to which the antennas were mounted on the outside of the airplane were a crucial factor in the decision to install new antennas. The existing hard points limited expansion of an antenna array. “At that point we saw an opportunity to do something that would allow us to put a much larger antenna array on the P-3, so we went ahead and proposed the idea of installing three different subarrays, which would allow us to put 15 elements on the P-3, whereas we only had 8 before,” Leuschen said.

After the installation, the aircraft had weeks of additional testing to go through. Once installed, the antenna subarrays needed force tests, vibration tests, and aerodynamic simulations. When the simulations gave satisfactory results, the plane ran its propellers to test the effects of airflow on the structures. After several in-air tests, the plane was flown over the Atlantic ocean, just off the coast of Virginia, to test the initial performance of the radar systems with the new antennas.

Increasing the number of antennas on an airborne radar is like increasing the megapixels on a camera. The more antennas, the higher resolution the final product. By increasing the number of antennas in the array, the resolution of the radar was also increased. The new array is co-linear, which means that rather than having the antennas oriented in the direction of the flight, the new arrangement is perpendicular, which helps to reduce clutter problems caused by rough ice surfaces.

Overall, Leuschen said that the new antenna arrays will help produce data with more detail in the layering, better resolution, and better accuracy, CReSIS projects focus on some of the most difficult terrain to sound. The P-3 will fly over temperate glaciers, glaciers with surface melt, and glaciers with liquid water at the bed. In such terrain, as in mountainous areas and areas with crevassing, the radar must be able to reduce clutter, or unwanted signals. The new array on the P-3 is fine-tuned to do exactly that.

“These antennas will be able to focus the beam where we’re looking straight down, and the amount of energy that’s actually going off to the side is much less, so we won’t see much clutter, which masks the bedrock, so we’ll be able to filter that out better.” - LEUSCHEN

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CONTINUED: Installation of a New Antenna Array on a P-3 Aircraft

Emily Arnold, a graduate student in Aerospace Engineering, spent weeks helping with the installation on the P-3. “They recently sent us a photo that they generated from some of the data they gathered from the P-3 and it’s probably the best image I’ve ever seen from data we’ve gathered,” she said.

The new array on the P-3 has already been put to hard, subzero work in Greenland, contributing to NASA’s Operation IceBridge program. The IceBridge program is a six-year endeavor, the largest survey of polar ice ever flown. The P-3’s improved radar will help produce quality data about the changing behavior and features of the Greenland and Antarctic Ice Sheets.

For Rick Hale, the technological advances complement another innovation this field season: the speed of data transfer. From his desk in Lawrence, KS, Hale was able to receive data collected only 24-hours before from thousands of miles away.

“We are now getting very quick turnaround on pretty high fidelity data. That’s the most interesting story this year. Usually we collected significant amounts of raw data, got some field processing to some level of fidelity, but it was well after we got home and processed the data that we would have learned what we might have needed to perhaps improve the mission.” - HALE

Polar Expedition Opera Hits the High Notes

// BY NICK MOTT

The worlds of opera and polar ice sheets rarely intersect. On April 8th, however, the two fields found a rare point of convergence during the KU School of Music’s Helianthus Chamber Operas.

Lisa Neher’s “White Horizon,” one of four operas performed, followed the true story of Fridtjof Nansen, a Norwegian explorer, and his attempt to be the first to reach the North Pole. Nansen knew that during his journey into the uncharted, icy seas, he would encounter potentially hull-crushing pack ice. In order to combat the deadly ice, he constructed a ship, the Fram, that he thought could withstand the power of the freezing ice. His ship, however, would freeze into the ice and be carried along by the ice drift until he reached the North Pole. The Pole, he thought, was pure ice. There was no land lying beneath.

Nansen stocked his ship with provisions for five years, including a windmill, a printing press and a library. The explorer, though, was in for a surprise. At a certain point, his expedition stopped going according to plan, and he was forced to make adjustments to his initial preparations. Though Nansen was eventually forced to turn back and never reached the North Pole, he was a pioneer in the field of polar science and expedition and made it farther north than had anyone before him.

Lisa Neher, the production’s composer, said that she was attracted to the story by Nansen’s sheer passion.

“I know a lot of passionate people in life who love what they do, but I don’t think very many of us are called on to put yourself on the line that much.” - NEHER

CReSIS staff and students gave a short presentation before the show began and presented a slideshow during intermission to show modern advances in polar science. Neher said that the show was also able to utilize fabulous arctic photographs to set a background for the performance.

“I think it really enriched their experience, Because opera is inherently interdisciplinary, it made sense to reach out to other departments on campus that could inform these productions.” - NEHER

Neher said that the performance had a fantastic turnout and lots of enthusiastic audience members. “I don’t know of many other colleges that are doing something like this where they’re really working on producing new operas, not only writing them but getting them the chance to get performed and get out there,” she said.
CReSIS Undergraduate Selected for Internship at the National Geographic Society

// BY NICK MOTT

For those who love travel, faraway places, and scientific innovation, a simple yellow portrait frame conjures far more meaning than does a mere monochromatic rectangle. The image, a picture KU senior Julia Guard would be quick to identify, is the logo of the National Geographic Society. The Society recently hired Guard as an intern, a prestigious position at an organization dedicated to informing the public about scientific breakthroughs and exploring the natural world.

The National Geographic Society accepts only five to eight interns a year out of a pool of high-achieving juniors, seniors, and graduate students. Guard will be assigned to work on the Society’s magazine, website, educational initiatives, or special projects.

“I want to get my hands on everything when I’m there — take on as many projects, or roll around as many ideas as I can.”

— GUARD

Guard, a senior in Geography with a minor in business, works as a Research Assistant at CReSIS. At CReSIS, she has created GIS-based lesson plans and compiled data on Thwaites Glacier in Antarctica. Guard said that her work as Research Assistant might be particularly attractive to the National Geographic Society since CReSIS has twice been featured in the magazine. She presented her research, entitled “Glacier Change in Antarctica: From Idealism to Substance,” at the Undergraduate Research Symposium on April 2.

In her time at KU, Guard spent over three years on the women’s rowing team and studied abroad twice, once in Northern Ireland and once in South Africa. She feels that her travels shaped her personally and made her a more attractive candidate to the National Geographic Society. Guard tries to live by a self-described “cheesy” piece of wisdom: Travel is the antidote to ignorance. “It’s really become my anthem,” she said. “I think travel is really important and it’s been a vital part of my life.” Her time in South Africa also inspired her undergraduate Honors thesis about HIV/AIDS transmission networks in the country.

Guard is excited for her time at the National Geographic Society. “Working for them is not only a great stepping stone to any other career ambitions in the future, but you’re also part of something that a lot of people respect and care about,” she said.

Guard thinks that National Geographic is a truly universal magazine. “Anybody can pick it up and appreciate the quality of the writing and the photographs,” she said. “I think it’s a great way that we document this earth, and National Geographic does a fantastic job.”

NASA Researcher Presents at KU

// BY NICK MOTT

On February 9, Jack Kaye, Associate Director for Research in the Earth Science Division of NASA, delivered a presentation entitled “Space-Based View of a Changing Climate and Its Implications” at the Dole Institute of Politics. On February 10, he presented “NASA Satellite Observations and their Role in the Study of Global Change” to CReSIS faculty, students and staff.

Kaye, trained in Chemistry, said that his division looks at everything from the earth’s core to the stratosphere. Such a broad program is interdisciplinary, encompassing everything from geology to oceanography to meteorology to geophysics. “You name it,” he said.

NASA is unique in that the organization focuses on using data from satellites in orbit around earth. “When the satellites go up and start looking down, that’s when my program goes to work,” Kaye said.

He said that satellite data helps to characterize the variability inherent in Earth’s system by looking at the forces that act on it. Kaye’s division looks at forces from without, like the sun, forces from within, like volcanoes, and contributions that humans may make. Human interactions with the planet, such as increasing greenhouse gas concentrations, changing the makeup of the land surface through urbanization, and deforestation, have scientifically tangible effects that have the potential to change the way the system works, he said.

Kaye said the Earth Science Division is also concerned with understanding how different pieces of Earth’s system interact with each other.

“This is our planetary home and we really should know what our environment is.”

— KAYE

Ultimately, Kaye said, researchers at his division at NASA seek to develop computer models that quantitatively test scientific understanding of Earth’s system processes. Accurate models, he explained, “will let us retrospectively convince ourselves that we actually understand the way the earth behaves, and that then gives us the confidence to predict into the future.”

For Kaye, the true value of satellite data on global change rests on predictive power. “Collectively, we all make environmentally-informed decisions,” he said. At a rudimentary level, when leaving the house in the morning, one decides whether or not to bring an umbrella on the basis of the probability that it will rain. One decides whether or not to wear a heavy coat and gloves on the basis of the expected temperature. Businesses, individuals and policy-makers, though, make environmentally-informed decisions on a much larger time-scale.

Though dogsleds or plane flights might track a limited area only a few times, satellites cross each pole 60 times a day, thus enabling the creation of a long-term database. Kaye claims that the scientific community ultimately needs an integrated scientific approach composed of satellite data, remote sensing technology, and other useful technologies and research methods.

Kaye finds his work at NASA fascinating because of the unique potential of satellites and the free and equal spread of scientific information throughout the world. For the first time, environmental data is available to developing countries that otherwise lack the infrastructure to collect their own information. “We’re not simply doing science,” he said. “We’re providing information to people so that they can try to make better environmental decisions, better policy, and, in real time, protect life, health and property.” This protection is becoming increasingly important. As polar ice melts, Kaye claimed, sea level will rise. Many coastal countries are incredibly sensitive to even minute rises.

“Good environmental information will help them think about what they’re going to do, as well as help the nations of the world decide how to take some of these considerations into their environmental policies.”

— KAYE

Kaye, though, identifies one of the primary luxuries of his position as the strictly apolitical, scientific nature of his work. “We’re not a regulatory agency, we’re a not a policy making agency. Our focus is on science.”

David Braaten, Deputy Director of CReSIS, said that both presentations had a fantastic turnout. “Both talks were very informative and well-received.”

CONTINUED ON NEXT PAGE
“Mutatis Mutandis” Installation Featured in Spooner Hall

// BY SHAWN SCHALLER

The power and enormity of the topic was palpable from the moment the doors opened. Thunderous cracks and massive splashes of sound brought color to the grayscale imagery of “Mutatis Mutandis,” a special sensory exhibition that represented two natural occurrences spanning hundreds of thousands of years: glacial movement and melting.

The installment, funded by The Commons, ran in Spooner Hall at the University of Kansas from Saturday, April 16, 2011, until Saturday, April 30, 2011. The exhibit made a strong statement about the state of the world we live in, but also intended for observers to discover its meaning for themselves.

“I wanted it to be primarily about the data,” co-artist Nolan Lem said. “Hopefully the glaciological position will be implicit by the way we represent the data.”

Black and white banners of detailed glacial radar echograms lined the sides of the exhibit, while a projector screen centered on the back wall of the large room played a continuous stream of echograms to represent actual glacial movement. These glacial X-rays, so to speak, literally gave viewers a look inside the physical composition of a glacier.

Accelerated sound bites of glacial movement sounds recorded over several years composed the natural symphony of cracks and splashes that filled the room. A vast space in the center of the exhibit sat bare; during weekend showings, a large block of ice slowly melted away for visitors to observe, adding yet another dimension to the piece.

CONTINUED: NASA Researcher Presents at KU

Braaten said that the lectures brought attention to the climate change issue and highlighted incredible data sets available through NASA that enable the examination of many geophysical and geochemical aspects of earth system science.

Kaye hopes that his lectures helped the Kansas and CReSIS communities to understand the role of satellites in global observations and the study of global change. “This isn’t just looking after ourselves,” he said. “This is something that can contribute to the welfare of humanity. Environmental information means in principle that people can make better decisions.”

Too often people perceive science as a dry, boring, impersonal endeavor. Kaye thinks that this couldn’t be further from the truth. “It’s a great time because it’s stuff our ancestors could only dream about. What was over the horizon, we didn’t know. What was on the other side of the world, we didn’t know. What’s going to happen a couple days from now, we didn’t know.” Scientists of all disciplines now have access to unparalleled scientific technology and information.

“There’s not a day that goes by that I don’t get excited about this stuff,” Kaye said.

Together, these facets of the installment combined nature, technology and the human mind and body into a single exhibit, simply titled “Mutatis Mutandis.”

“It means ‘by changing those things which need to be changed,’” Lem said of the exhibit’s Latin title. “We’re just representing the data in a manner that suits our respective mediums.”

Lem, an electrical engineering undergraduate student at the University of Kansas, was referring to data collected over the Greenland ice sheet using technology developed by the Center for Remote Sensing of Ice sheets. The data-intensive exhibit specifically targeted the auditory and visual human senses.

Tristan Telander, the graphic designer for the Spencer Museum of Art, used raw data to create the visual art by way of programming. Lem, with the help of Kip Haaheim, an associate professor of music, converted sound bites of glacial movement into the audio stream. The collaboration of the two elements, Telander and Lem said, resulted in a stronger project overall.

Thanks to Haaheim, Lem and Telander, what started out as a discordant set of numbers and letters was transformed into a sensory enclosure that quickly lured visitors into its natural rhythm. Even the slightest change in picture or sound provided a jolt back to reality, as if the natural order of the world had momentarily halted.

The raw data was far more complex than the average human can process, but the art of “Mutatis Mutandis” sent the message loud and clear.

LEFT: A speaker played accelerated sound bites of glacial movement recorded over several years while guests observed a glacial echogram.

LEFT: The exhibit’s logo represented the meaning of Mutatis Mutandis, “by changing those things which need to be changed”. (All photo credit Terry Evans and Spencer Museum of Art)
Mitchell, ECSU to Host Summer Cloud Computing Workshop

// BY SHAWN SCHALLER

Elizabeth City, N.C.: Indiana University and CReSIS graduate student Jerome Mitchell will host a cloud computing workshop at Elizabeth City State University from June 7–July 5, 2011. Cloud computing, CReSIS’ primary data-management resource, is the growing concept of remote data storage and processing.

Mitchell said the ultimate objective of the workshop is to educate students who lack opportunities to learn about advances in computing technology. Attendance at the workshop will not be limited, but Mitchell said he hopes the program will reach minority students specifically.

Through the use of a “teach one, teach many” approach, Mitchell said he hopes to educate as many people as possible. This approach involves targeting faculty and administrators who, according to Mitchell, can pass the knowledge onto their respective classes of 25 to 30 students. A diverse audience is key to the reach and influence of the workshop.

Activities throughout the first week of the workshop, June 7-10, will primarily be directed toward faculty and administrators. Graduate students and research education undergraduate students are invited to participate in the workshop for the duration of the month.

Mitchell, a graduate research assistant, will present several types of technology throughout the workshop, including cloud computing and programming models. One program Mitchell will display, FutureGrid, is an experimental system developed by Indiana University to communicate cloud concepts.

Parallel Processing

Programming Model

Functional Programming

Used by

Map / Reduce

CGL's Implementation

Twister

A diagram featured in one of Mitchell's presentation provides a breakdown of cloud computing. Image courtesy of Jerome Mitchell.

More information about CReSIS Advisory Board Members can be found on pages 6 and 7.

Advisory Board Visits CReSIS Headquarters

// BY SHAWN SCHALLER

The CReSIS Phase II Advisory Board, a select group of distinguished scientists, engineers, professors and business leaders, convened at the University of Kansas on Thursday, April 28 and Friday, April 29, 2011.

Board members spent two days participating in discussions concerning every facet of CReSIS deployments, technology, and research results, searching for any opportunity to share their individual expertise for the benefit of the CReSIS mission. At the end of the 2011 session, the members yielded numerous positive comments about the continued growth and success of the CReSIS programs.

“With the help of their partners, they’ve developed a world-class program.”

– JEFFREY STEPP, senior engineer for Honeywell Federal Manufacturing and Technologies, LLC, in Kansas City, Mo.

Dr. Scott Beaven, the vice president of research and development for the Space Computer Corp. in Los Angeles, said that CReSIS demonstrated valuable, positive work toward addressing prominent, global environmental issues. The two-day session in particular, Beaven said, provided quality interaction between the Board and the CReSIS faculty, staff and students that he hoped was both informative and useful to the program.

The Phase II Advisory Board, so called for its participation during the second five-year phase of the Center, is charged with examining the CReSIS program from a variety of different perspectives, Beaven said. The board’s members have expertise in a wide array of subjects and each uses his respective background to offer suggestions to help the program move forward.

Beaven and Stepp bring a unique feel for technology to the Board. The other eleven members provide backgrounds in business and finance, education and diversity, geophysical research, as well as technology.

An unusually large number of new members also contributed fresh perspectives on the program during the April meeting Suresh Ramamurthi, Herb White, Jonathan Bamber, Ted Clarke, Roger Hathaway, Tony Hey, David Holland, Christopher Shuman and Beaven all participated for the first time. These newcomers were joined by just four returning members: Stepp, Charles Luther, William Harrison, and Carl Person.

During the two-day session, Board members had the opportunity to interact with students from an equally diverse number of disciplines. CReSIS graduate and undergraduate students hosted a poster session where each demonstrated his or her work and research within the Center.

Stepp said that the poster presentations and the interactions with the students, the future of the program, were his favorite part of the entire advisory board meeting. Beaven, on the other hand, said the location held special significance for him.

“For me as an alum, it’s just great to come back to Lawrence in the springtime,” said Beaven, who earned his Ph.D. in electrical engineering from the University of Kansas. “Usually I’m only here during the holidays when it’s cold.”

More information about CReSIS Advisory Board Members can be found on pages 6 and 7.
Meet the 2011 Advisory Board
// BY JENNA COLLINS

Jonathan Bamber, PhD
Director, Bristol Glaciology Centre
UNIVERSITY OF BRISTOL

Jonathan Bamber is a professor in physical geography. He graduated from Bristol University with a degree in Physics in 1983 and completed a Ph.D. at the Scott Polar Research Institute, University of Cambridge, in glaciology and remote sensing. He then spent eight years in the Department of Space and Climate Physics, University College London before returning to Bristol in 1996. His main areas of interest are in applications of remote sensing data in the polar regions. More specifically, he has been working on the use of remote sensing data to elucidate the morphology and dynamics of the Antarctic and Greenland ice sheets. He has recently begun work on cryosphere-climate interactions and feedbacks by through a combined modelling and observational approach. He is also involved in remote sensing research in the department and has interests in the use of remote sensing data for a variety of other applications such as the generation of digital elevation models and in oceangraphy.

Scott G. Beaven, PhD
Vice President, Research & Development
SPACE COMPUTER CORPORATION

Dr. Beaven received a Ph.D. degree in Electrical Engineering from the University of Kansas in 1995. From 1990-1995 he was a Research Assistant and Office of Naval Research Doctoral Fellow at the University of Kansas Radar Systems and Remote Sensing Laboratory, and from 1995-2000 he was with the Space and Naval Warfare Systems Center-San Diego (SSC-SD). While at SSC-SD, he served as Program Manager for real-time target detection and recognition under DARPA’s Adaptive Spectral Reconnaissance Program (ASRP). Since joining Space Computer Corporation in 2000, Dr. Beaven’s work has focused on adaptive detection and exploitation processing for hyperspectral, multispectral and multi-sensor image data. He is currently focused on research and development of multi-sensor exploitation, change detection and hyperspectral tracking concepts.

Ted Clarke, PhD
Senior Geophysicist
EXXONMOBIL EXPLORATION COMPANY

Ted Clarke is an Advisor in ExxonMobil’s Geophysical Operations group. He is responsible for oversight of design, technical detail and data quality of ExxonMobil’s seismic acquisition programs in Africa, Europe and Russia. He is on temporary assignment managing a seismic project in Iraq. Prior to joining ExxonMobil in 1996, he worked on glacier hydrology and mass balance in Alaska, spent several seasons carrying out seismic reflection studies in Greenland and several seasons working on ice-penetrating radar and seismic refraction studies in Antarctica. Dr. Clarke received his Ph.D. in Geophysics from the University of Wisconsin.

William Harrison, PhD
Professor of Physics Emeritus
UNIVERSITY OF ALASKA

William Harrison has his Ph.D. in nuclear physics and did postdoctoral work at the University of Minnesota, Caltech, and the University of Washington. He has done research in nuclear physics, permafrost, and glaciers and ice sheets. He has worked in Alaska, the Lower 48, Greenland, and Antarctica, where his interests have been primarily in the area of ice flow and, most recently, in the measurement of glacier changes in western North America. He served a term as a joint Chief Editor of Journal of Glaciology.

Roger Hathaway, PhD
Director, Office of Education
NASA LANGLEY RESEARCH CENTER

Roger Hathaway began his federal career in 1983 as an educational programs officer serving precollege institutions in North Carolina, South Carolina, Kentucky, West Virginia and Virginia. Over his 22-year career with the Agency, he has served as a NASA consultant to national education associations, state and regional school and university administrations, private industry and local businesses. He has been a leader in such programs as the Cooperating Hampton Roads Organization for Minorities in Engineering (CHROME), the Summer High-School Apprenticeship Research Program (SHARP), the Virginia Chamber of Commerce Business/Industry/Government-Education (Big-Ed) Council and Langley’s Explorer Post program.

Tony Hey, PhD
Corporate Vice President
MICROSOFT RESEARCH CONNECTIONS

As corporate vice president of Microsoft Research Connections, Tony Hey is responsible for worldwide external research (ER) collaboration in Microsoft Research. Before joining Microsoft, Hey served as director of the U.K.’s e-Science Initiative, managing the government’s efforts to provide scientists and researchers with access to key computing technologies. Before leading this initiative, Hey worked as head of the School of Electronics and Computer Science, and dean of Engineering and Applied Science at the University of Southampton, where he helped build the department into one of the most respected computer science research institutions in England. His research interests focus on parallel programming for parallel systems built from mainstream commodity components.

David Holland, PhD
Director, Center for Atmosphere-Ocean Science
COURANT INSTITUTE OF MATHEMATICAL SCIENCES, NEW YORK UNIVERSITY

David Holland is a Professor of Mathematics and Atmosphere-Ocean Science in the Courant Institute of Mathematical Sciences (CIMS) of New York University (NYU). He also serves as the Director of the Center for Atmosphere-Ocean Science (CAOS). Dr. Holland joined NYU in 1998 as an Assistant Professor. Prior to that he was an Associate Research Scientist at the Lamont-Doherty Earth Observatory of Columbia University. Dr. Holland is an oceanographer studying phenomena of the polar oceans and their impacts on global climate, for example, the global sea level. His current research interests include the study of the interaction of floating ice shelves with polar ocean waters, the acquisition and implementation of observational data for model improvements, and the study of the teleconnection between polar and temperate/tropical latitudes.

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CReSIS Welcomes Two New Staff Members

// BY SHAWN SCHALLER

**Shawn Schaller** joined CReSIS as a Student Journalist in April 2011. He is also a student tutor at KU’s Academic Achievement and Access Center. Mr. Schaller grew up in St. Leo, Kansas, and is set to graduate from the University of Kansas in May 2012 with degrees in Journalism and Spanish. In his free time, he likes to fish and write sports columns for his hometown newspaper. While at CReSIS he intends to exercise his journalistic writing skills and help increase local awareness of CReSIS technology, research and educational achievements.

**Judith Riley** (formerly Berglund) joined CReSIS as a Project Manager in January 2011. She received her B.S. in Geology from Wheaton College in Illinois and an M.S. in Geography with an emphasis in Geospatial Technology and Remote Sensing from the University of South Carolina. Most recently she served as a technical contractor for the NASA Applied Sciences Program at the Stennis Space Center in Mississippi. At the Center for Remote Sensing of Ice Sheets, Ms. Riley assists with field deployments and remote sensing research. She said she was drawn to the program because geology and remote sensing are her passions.

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**Charles A. Luther**
Scientific Program Officer
OFFICE OF NAVAL RESEARCH

Charles Luther began his career as a Second Lieutenant in the U.S. Air Force, where he spent three years as an Engineering Project Officer developing flight simulators and was later employed with the Aeronautical Systems Division at Wright-Patterson Air Force Base. His career continued as a Deputy Program Manager at the Naval Electronics Systems Command, and as a Scientific Program Officer at the Office of Naval Research, where he led the Navy’s basis research programs in sea ice microwave remote sensing.

**Suresh Ramamurthi**
Scientific Program Officer
BC CAPITAL, INC.

Suresh Ramamurthi is Vice-Chairman at CBW Bank and heads up wholesale banking including new products and services. He leads CBW Bank’s initiatives to support and foster innovation including working with financial services start-ups. He also serves as a Principal at BC Capital, an early stage investment firm. A veteran technology entrepreneur, Suresh has founded and exited two start-ups, and has previously worked at Google Inc. Suresh’s first start-up, PowerFax, developed and manufactured wireless hardware and software applications. PowerFax’s wireless technology went on to become the basis for the ubiquitous “Guide Button” on television remote controls.

**Jeffrey D. Stepp**
Senior Engineer
HONEYWELL FEDERAL MANUFACTURING & TECHNOLOGIES, LLC

Jeffrey Stepp is a Senior Engineer at the National Nuclear Security Administration’s Kansas City Plant (KCP), operated by Honeywell Federal Manufacturing & Technologies, LLC where he has worked since 1998. He is currently involved in the development of advanced RF & Microwave sub-systems for government mobile satellite, Doppler radar, advanced telemetry, and wireless LAN market segments.

**Christopher Shuman, PhD**
Scientific Program Officer
NASA GODDARD SPACE FLIGHT CENTER

Christopher Shuman is an Associate Research Scientist for the University of Maryland’s Goddard Earth Science and Technology Center at Goddard Space Flight Center (NASA/GSFC) in Greenbelt, Maryland. As a member of the Planetary Geodynamics Laboratory in the Topography and Surface Change group, he is working with Dr. David Harding on a new swath laser altimeter, and continuing to study the Antarctic and Greenland ice sheets using satellite and field observations. Of particular interest is assessing elevation change with ICESat laser altimeter data and the nature of Antarctica’s large subglacial lakes. The overall goal is to help understand the current status of these vast ice sheets in the climate system so that their future may be predicted. He is also an Adjunct Faculty member of the Earth System Science Interdisciplinary Center at the University of Maryland, College Park.

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**Carla S. Person, PhD**
Manager
MINORITY UNIVERSITY RESEARCH AND EDUCATION PROGRAMS (MUREP)
NASA OFFICE OF EDUCATION

Dr. Person is currently responsible for helping NASA ensure the participation of underrepresented and underserved populations in its programs, projects and activities as the Manager of MUREP and as NASA’s Historically Black Colleges and Universities (HBCU) Program Manager. Prior to joining NASA in 1999, Dr. Person was employed by the US Department of Education as Director of the Institutional Development and Undergraduate Education Service and as Executive Director of the HBCU Capital Financing Program.

**Herb White**
President
W. HERBERT WHITE & CO., INC.

Herb White is a serial entrepreneur in technology. He currently serves as president of W. Herbert White & Co., Inc. and three of its affiliated companies and Cedar Ridge– a not-for-profit residential facility. Mr. White graduated from the University of Kansas in 1960 with a BSEE and from the University of Chicago with an MBA in marketing. He works with universities in the United States and Europe, as well as government entities like NASA, to identify and commercialize technology-based game changers. Mr. White also gives talks on entrepreneurship for organizations such as the Kauffman Foundation.

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**Jeffrey Stepp**
Senior Engineer
HONEYWELL FEDERAL MANUFACTURING & TECHNOLOGIES, LLC

Jeffrey Stepp is a Senior Engineer at the National Nuclear Security Administration’s Kansas City Plant (KCP), operated by Honeywell Federal Manufacturing & Technologies, LLC where he has worked since 1998. He is currently involved in the development of advanced RF & Microwave sub-systems for government mobile satellite, Doppler radar, advanced telemetry, and wireless LAN market segments.

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**Christopher Shuman, PhD**
Scientific Program Officer
NASA GODDARD SPACE FLIGHT CENTER

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Herb White is a serial entrepreneur in technology. He currently serves as president of W. Herbert White & Co., Inc. and three of its affiliated companies and Cedar Ridge– a not-for-profit residential facility. Mr. White graduated from the University of Kansas in 1960 with a BSEE and from the University of Chicago with an MBA in marketing. He works with universities in the United States and Europe, as well as government entities like NASA, to identify and commercialize technology-based game changers. Mr. White also gives talks on entrepreneurship for organizations such as the Kauffman Foundation.

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Jeffrey Stepp is a Senior Engineer at the National Nuclear Security Administration’s Kansas City Plant (KCP), operated by Honeywell Federal Manufacturing & Technologies, LLC where he has worked since 1998. He is currently involved in the development of advanced RF & Microwave sub-systems for government mobile satellite, Doppler radar, advanced telemetry, and wireless LAN market segments.

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