National Aeronautics and Space Administration

AEROSPACE Frontiers

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Center Recreates Historic Anniversary Groundbreaking

NASA Glenn kicked off its diamond anniversary the way it began 75 years ago. On Jan. 25, 2016, Glenn leadership and local dignitaries gathered at Lewis Field to reenact the Jan. 23, 1941, center groundbreaking.

Center Director Jim Free welcomed employees and guests, leading a series of speakers that included Facilities, Test and Manufacturing Director Tom Hartline; Brook Park Mayor Tom Coyne; Chief of Regional Development for the City of Cleveland Edward Rybka; and Glenn History Officer Anne Mills. NASA Administrator Charles Bolden and NASA Glenn's namesake, former astronaut and U.S. Senator John Glenn, provided heartfelt congratulatory video messages.

75th Groundbreaking Reenactment: Left to right: Edward Rybka, chief of Regional Development, City of Cleveland; Fred Szabo, commissioner, Cleveland Hopkins International Airport; Joseph Roman, president and chief executive officer, Greater Cleveland Partnership; Thomas Hartline, director of Facilities Test and Manufacturing; James Free, center director; Dr. Richard Fingers, acting deputy, Aerospace Systems Directorate, Air Force Research Laboratory; Therese Griebel, director of Aeronautics; Dr. Marla Perez-Davis, deputy director of Research and Engineering; George Lewis, grandson of Lewis Field namesake; Thomas Coyne, mayor of Brook Park.

Hartline, who oversees the management of NASA Glenn's institutional and test facilities, systems and infrastructure, assured the audience of the center's vitality. "It takes a lot of care and feeding to keep a center running for 75 years," he said, "and for a 75-year-old, our center is pretty healthy and vibrant!"

Free affirmed the center's vitality by providing past and current examples of accomplishments and contributions to the nation. "Over the past 75 years, NASA Glenn has helped our nation maintain its leadership in aeronautics achievements and space exploration," he said, "while continuing to push the boundaries of our understanding of the universe around us for the benefit of all."

Coyne echoed these sentiments. He noted NASA's "affinity for dreaming," and pledged his continued support to NASA Glenn. "Everything begins here," he said.

In an engaging look back at the center's history, Mills compared NASA Glenn to a quality diamond. "It takes two things to make a diamond: time and pressure," she said. "We've had a steady stream of that here. We have been called on time and time again to do the impossible."

Continued on page 3

Plum Brook Station Hosts "State of NASA"

Path to Mars Comes Through Here

NASA Glenn opened the doors at its Plum Brook Station to media and social media representatives, Feb. 9, for a "State of NASA" event. Participants were treated to a behind-the-scenes look at the center's work in NASA's mission to send astronauts into deep space. The event included media tours and presentations of the Space Power Facility—where engineers are currently

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In This Issue

Safety Plan Enables Transport of Rare Artifact

As we celebrate NASA Glenn's 75th anniversary, we are looking back to one of the proud moments this center has played in NASA history, our key role in the Centaur Program. I'm excited that we'll have the opportunity to display an actual Centaur G-Prime rocket at Lewis Field. Getting the 6,600-pound rocket and its 6,000-pound integrated support system to Cleveland from Huntsville, Alabama, however, is no easy feat. The relocation of the hardware requires adherence to stringent OSHA regulations and NASA-specific requirements. Many thanks to our Safety and Mission Assurance; Center Operations; and Facilities, Test and Manufacturing Directorate staffs for coordinating plans to assure safe and secure transport and installation of the rocket in front of the Administration Building. This majestic artifact will serve as a reminder of our contribution and rich tradition in space development.

Let's celebrate our aerospace heritage where mission success is enabled by teamwork and excellence! —*Jim*

Glenn's 75th Anniversary Public Open Houses

Lewis Field
May 21 and 22
10 a.m. to 6 p.m.

Plum Brook Station
June 11 and 12
10 a.m. to 6 p.m.

CELEBRATING 75 Years 1941–2016
GLENN RESEARCH CENTER

Mark your calendar and bring your family and friends. Look for details in the April *AeroSpace Frontiers* on how you can be part of the festivities.

www.nasa.gov/glenn75
#NASAglenn75

Headquarters Leaders Talk About New Operating Model

On Jan. 21, NASA Associate Administrator Robert Lightfoot Jr. and Deputy Associate Administrator Lesa Roe, traveled to Glenn to update employees on the agency's efforts to develop a new operating model.

Their visit started with a tour of Plum Brook Station facilities in the morning, followed by an All Hands meeting at Lewis Field.

Center Director Jim Free kicked off the All Hands by highlighting several of Glenn's technological accomplishments over the past year. Lightfoot applauded those efforts and noted NASA earning "Best Places to Work" honors in the large agency category from the Partnership for Public Service.

"I appreciate the work you've done in 2015 and what you're going to do in 2016," Lightfoot said.

The Headquarters' visitors then shared examples of how the agency is analyzing areas such as program/project planning, agency integration, strategic workforce planning and competition practices to determine a new operating model. These activities have engaged leadership across the agency in examining current practices and determining new ways of working that can enable the agency to maintain critical capabilities and meet current and future mission needs. Details and updates on these efforts can be found at https://nbat.hq.nasa.gov/bsa/aa_communications_and_briefings. (internal)

Lightfoot stressed that these efforts are not all about reductions but about investments in NASA's future.

"These challenges can become opportunities to do things differently," Roe affirmed.

The visitors addressed several questions from the audience as well as questions posted earlier and during the meeting via a new online tool. The Conference i/o tool allows employees to post questions and vote on which questions they feel are most important. Those questions then rise to the top of the list.

During their visit, Lightfoot and Roe also met with senior leadership, shared lunch with some of Glenn's early career employees and talked with employees in NASA's FIRST (Foundations of Influence, Relationships, Success and Teamwork) program.

By Doreen B. Zudell

GRC-2016-C-599 Photo by Bridget Caswell

Lightfoot, left, and Roe provide updates on the agency's new operating model.

Historic Groundbreaking

Continued from page 1

Wielding the original nickel-plated pick and shovel, participants gathered to assume the roles of their original counterparts in the reenactment. The event concluded with a short reception that featured 75th anniversary cakes and light refreshments.

GRC-2016-C-323 Photo by Marvin Smith

Glenn Historian, Mills, takes a look back to the original groundbreaking.To her left is the original nickel-plated pick and shovel.

GRC-2016-C-298 Photo by Marvin Smith

George Lewis, left, grandson of his namesake, and Harvey Lewis, right, great grandson of the original George Lewis, attended the event.

"State of NASA"

Continued from page 1

evaluating a test version of the Orion European Service Module—and the Spacecraft Propulsion Research Facility. The tour also highlighted some of Plum Brook's efforts to be good stewards of the environment.

Center Director Jim Free welcomed guests and noted the center's 75th anniversary. "This is a special year for us to celebrate our accomplishments and our people," he said.

Free stressed Glenn's technical expertise and commitment to maintaining its role as a leader in aeropropulsion research. These capabilities will enable the center to develop critical technologies needed to get to Mars. "The path to Mars comes through here," he said.

Additionally, the media connected remotely with NASA Administrator Charles Bolden from NASA's Langley Research Center in Hampton, Virginia, via NASA Television. Bolden addressed the agency's scientific and technological achievements and cutting-edge future work. His presentation, titled "The State of NASA is Strong," included the announcement of President Obama's 2017 budget proposal of $19 billion for the agency. Included in the proposal is $598 million for Glenn.

"This $19 billion budget allows us to continue the progress we've been making over the past several years on our journey to Mars," Bolden said, "while launching a new initiative to accelerate aviation energy efficiency, transform propulsion systems and enable major improvements in safety and mobility."

Deputy Director Dr. Janet Kavandi was available to answer questions, and the event concluded with a briefing by NASA's Chief Financial Officer David Radzanowski on the agency's 2017 budget proposal. Glenn's Chief Financial Officer Larry Sivic then responded to reporters and social media queries on Glenn-specific allocations. The budget request must make its way through Congress for final approval.

For details on NASA's 2017 budget request, visit http://www.nasa.gov/news/budget/index.html#.VO7CIUjNeBM.

By Doreen B. Zudell

GRC-2016-C-668 Photo by Rami Daud

Social media participants tweet during their visit in the Space Power Facility.

GRC-2016-C-684 Photo by Rami Daud

Glenn's Nicole Smith, center, briefs participants on Orion hardware.

Glenn Invites Stakeholders to Partner in Anniversary Celebration

After the 75th Anniversary Groundbreaking Reenactment, Jan. 25, several Glenn key stakeholders/partners gathered in the Briefing Center to learn more about the anniversary. Center Director Jim Free shared information on upcoming events and encouraged partnering opportunities throughout the celebratory year. Center Operations Director Robyn Gordon provided opening remarks and 75th Anniversary Project Manager David DeFelice gave a project overview. Tours offered VIPs a glimpse of facilities scheduled for viewing during the May 21–22 Lewis Field Open House. Pictured: While on tour, Mike Heil, OAI president and CEO, examines a mesh wheel in the Simulated Lunar Operations (SLOPE) facility as WKYC meteorologist Greg Dee and others look on.

GRC-2016-C-356 Photo by Marvin Smith

Exhibit Honors Legacy of Exploration

Photo by David DeFelice

NASA held its annual Day of Remembrance, Jan. 28, to pay tribute to colleagues who lost their lives while furthering the cause of exploration and discovery. Center Director Jim Free led the observance at Lewis Field, acknowledging the 30th anniversary of the Challenger accident. That same day, NASA Glenn personnel joined the South Shore Convention Center and Visitors Authority and the Challenger Learning Center of Northwest Indiana in presenting a NASA Traveling Exhibit, "Inspiring the Future: The Legacy of Exploration." The exhibit opened with a presentation by retired astronaut Gregory J. Harbaugh, pictured, who honored the fallen astronauts and reaffirmed America's commitment to exploration. The event was held at the Indiana Welcome Center in Hammond, Indiana. The exhibit runs through March 27.

New SCaN Exhibit Making the Rounds

Glenn's Visitor Center at the Great Lakes Science Center is showcasing the Space Communications and Navigation (SCaN) Program's new interactive exhibit, the PufferSphere, through the end of March. The 360-degree, multitouch and interactive system can display video, photos, motion graphics, text and other visual resources and communicates the message of "Connecting the Universe" in a new, interactive way. Representatives from Glenn's Space Communications and Spectrum Management Office will then take the 2-foot sphere exhibit to the Westin Cleveland for the Consultative Committee for Space Data Systems Spring Meeting in April and the Cleveland Museum of Natural History through mid-May. Pictured: The PufferSphere attracts people of all ages.

Photo by Lindsey Hill

Dr. Kavandi Connects With Students During National Engineers Week

GRC-2016-C-739 Photo by Rami Daud

In celebration of National Engineers Week, Deputy Director and astronaut Dr. Janet Kavandi addressed students and teachers via satellite through Glenn's Digital Learning Network, Feb. 18. With guidance from Glenn engineer-mentor, Danielle Koch, the eighth grade students from St. Ambrose School, Brunswick, took honors in the engineering-based 2015–16 Future City Competition. During the broadcast, Kavandi highlighted her role in the Shuttle Radar Topography Mission and encouraged the students to use their unique talents to help others. Rob LaSalvia and Roger Storm from Glenn's Office of Education also learned more about this program from Deborah Morgan, Future City Competition Regional Coordinator. Pictured: Deputy Kavandi answers questions from St. Ambrose students during the broadcast.

Celebrating a 75-Year Legacy

This is the second in a monthly series of historical highlights commemorating Glenn's 75th anniversary and extraordinary technical accomplishments that reach across 7 decades.

Looking Back: 1950s

Heat transfer, the movement of heat from one entity to another, is a critical element of aerospace engineering that addresses a broad range of issues. Since its inception, Glenn has been involved in heat transfer applied to issues such as engine cooling, high-strength materials, turbomachinery design, regenerative nozzle cooling, cryogenic propellants utilization and fuel cell development.

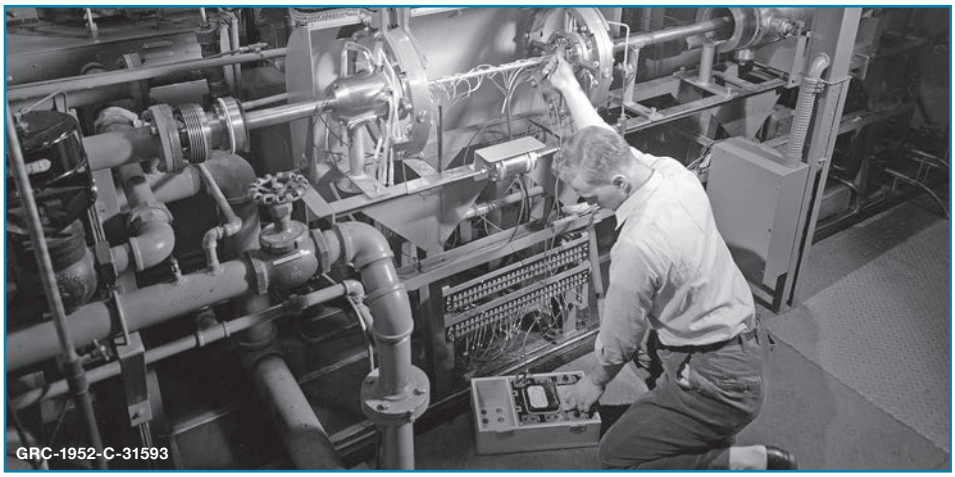
In the 1950s, the center possessed a corps of world-renowned heat transfer experts that literally wrote the textbooks that trained generations of engineers, while performing research of enduring importance. This included: Simon Ostrach's investigation of flow stemming from fluids of different densities and discovery that buoyancy was not solely tied to gravity; Robert Deissler's simplification of complex calculations that facilitated computer modelling and physical heat transfer experiments; and Robert Siegel's study of heat transfer issues related to the space program's boiling in microgravity and thermal radiation.

These men and their colleagues enjoyed long careers at NASA and in academia, publishing seminal papers and books while earning numerous awards and reputations as the "Giants of Heat Transfer." In 2015, Ostrach, Deissler, and Siegel were among the initial class of inductees into Glenn's Hall of Fame.

Courtesy of NASA Glenn History Office

GRC-1959-C-52076

Much of the center's heat transfer work in the 1950s related to nuclear propulsion. Pictured is a research engineer working with a high-temperature heat transfer rig as part of a study on the use of liquid hydrogen in nuclear rocket systems.



GRC-1952-C-31593

Technician monitors the high-pressure heat transfer test section and rig in CE-11 of the Engine Research Building.

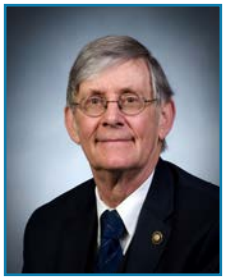
Retirements

Senior Leaders on the Move

Three of Glenn's senior leaders bid farewell to NASA Glenn after many years of dedicated service:

Director, Venture and Partnerships, **Dr. Robert "Joe" Shaw**, Office of the Director, retired Jan. 1, with 45 years of NASA service.

Associate Director of Strategy, **Dr. Howard Ross**, Office of the Director, retired Feb. 2, with 36 years of Federal service, including 30 with NASA.



Dr. Shaw

Dr. Ross

Glover

Diversity Management Officer, **Lynda Glover**, left Glenn Feb. 6, to take a position with the Department of Interior. She had 19 years of NASA service.

Trending With Tech Transfer

Sleep Center Licenses Glenn Monitoring Technology

NASA Glenn has signed an evaluation licensing agreement with the Massachusetts-based Marlborough Center for Sleep Disorders. This license allows the Center to use the Portable Unit for Metabolic Analysis (PUMA)—a mask-like monitoring system originally designed to monitor astronauts' oxygen consumption in space—in its sleep disorder research.

The Marlborough Center is a multidisciplinary facility for the evaluation and treatment of sleep disorders. It offers care from on-site, board-certified specialists in sleep medicine, pulmonary medicine, respiratory care and nutrition. Marlborough plans to use PUMA in metabolic studies to help people suffering from sleep apnea, diabetes, obesity and chronic obstructive pulmonary disease (COPD).

"The PUMA device gives us a small, portable, patient-friendly device that allows us to study metabolic function—wake, exercise, sleep—in several clinical situations," said Medical Director Dr. Clifford Risk. "We can then follow these results prospectively to adjust and optimize our patients' medical management." Marlborough is currently writing the protocols for its first set of studies using PUMA.

If you want to learn more about licensing, or if you're working on a technology with potential applications beyond a NASA mission, please contact Karen Bartos, ttp@grc.nasa.gov.

Submitted by Glenn's Technology Transfer Office

Calendar

BUCKEYE FIRST REGIONAL: The 15th annual Buckeye Regional FIRST Robotics Competition will be held March 17–19 at the Cleveland State University Wolstein Center. POC: Stephanie Brown-Houston, 3–8006.

DR. SHIN TO SPEAK: NASA Associate Administrator, Aeronautics Research Mission Directorate (ARMD), Dr. Jaiwon Shin, and his team will host an ARMD Town Hall, March 24, from 10 a.m. to noon in the Briefing Center Auditorium. The event will include an awards ceremony, budget rollout and an outlook for aeronautics, followed by a question and answer session. All are encouraged to attend. POC: Lisa O'Connor, 3–8018.

AMERICAN RED CROSS BLOOD DRIVE: You can help save a life! The American Red Cross staff will be in the Ad Building Auditorium, March 23–24, from 8:30 a.m. to 3:30 p.m. Please consider donating. POC: Rhonda Billick, 3–6286.

IFPTE LOCAL 28, LESA MEETING: LESA will hold its next membership meeting, Wednesday, April 13, noon, in the Glenn Employee Center's Small Dining Room.

In Appreciation

Thank you to all my co-workers and friends who stopped by for my retirement celebration. It meant a great deal to me. A very special thanks to my Office of Human Capital Management family for the terrific send off. Although I will miss seeing my NASA family, please know that you will remain in my heart and memories forever!

—Anita Arnold

Connect With Glenn

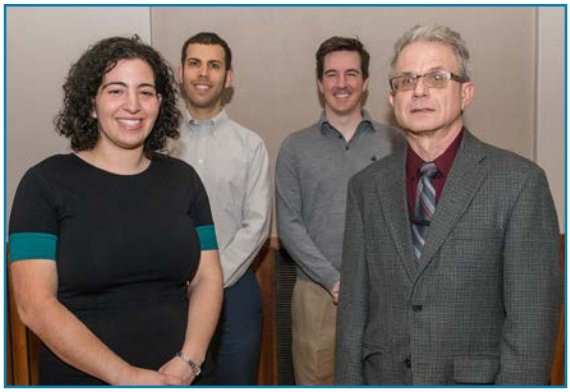
Welcome to the NASA Family

On Jan. 25, the following Glenn new hires reported for duty/orientation: **Gabriel F. Benavides**, Electric Propulsion Systems Branch; **Krzysztof W. Bzdyk**, Chemical and Thermal Propulsion Systems Branch; **Adam M. Gannon**, Architectures, Networks and System Integration Branch; **Charles A. Hoff**, Knowledge Management Systems Office; and **Clint A. Messner** and **Mark C. Wilson**, Engineering Management Branch.

GRC-2016-C-413 Photo by Marvin Smith

Seated, left to right: Gannon and Wilson; and standing, left to right: Benavides, Hoff, Messner and Bzdyk.

On Feb. 8, the following employees reported for duty/orientation: **Jennifer R. Amador**, Operational Safety Branch; **Donald W. Hange Jr.**, Program Management Office; **Benjamin A. Kowalski**, Environmental Effects and Coatings Branch; and **Steven L. McCarty**, Mission Architecture and Analysis Branch.

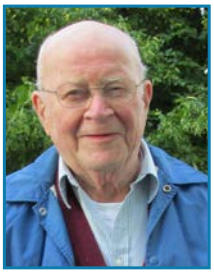


GRC-2016-C-621 Photo by Rami Daud

Front: left to right: Amador, McCarty, Kowalski and Hange.

More Than a Memory

Mike Chopich, 90, a 1982 NASA retiree and World War II Army Air Corps veteran with more than 20 years of federal service, died Dec. 18, 2015. Chopich began his NASA career as a mechanical engineer in the Plant Protection Section. He later transferred to the Facilities Operation Division's Engine Research Building Operations where he retired after supporting a variety of projects and missions.



Garrett

Floyd B. Garrett, 95, a 1980 retiree with more than 40 years of service, died Dec. 9, 2015. Garrett retired as chief of the Materials Characterization and Operations Branch. He was the Area 6-Safety Board Committee representative responsible for coordinating training activities and disposal of hazardous materials. Garrett also served as chairman of the Lewis Christmas Club, a charitable organization that raised funds for children with special needs.

McArdle

Jack G. McArdle, 89, a 1994 retiree and U.S. veteran with 44 years of federal service, died Dec. 27, 2015. McArdle was an aerospace engineer who made significant contributions to several high-profile projects as lead for the engineering research team in the Propulsion Systems Division. Two notable projects centered on advancing flight experiments, and a "convertible" gas turbine engine concept that enabled a new breed of civil and military high-speed rotorcraft that can operate efficiently from hover to transonic speeds.

CFC 2015 Team Achieves Goal, Earns Awards

Team members and supporters of Glenn's 2015 Combine Federal Campaign (CFC) gathered on Feb. 2 to celebrate a successful campaign. The center exceeded its goal of $425,000, with a total of $426,740! Additionally, the center earned several awards:

Directorate Awards

Highest Percentage of Participation
- Office of Chief Counsel (100 percent)

Highest Donations per Capita
- $817

Highest Percentage of Pacesetters
- 62 percent (Office of the Director)

Directorate Chairperson of the Year
- Jeff Csank

Keyworkers of the Year
- Brittany Schmidt and MaryAnn Sours

North Coast CFC (NCCFC) Campaign Awards

Chairperson's (Eagle) Award

Director's Award for Outstanding Leadership

Appreciation Award for Achieving 100 Percent of Goal

Above and Beyond Award
- CFC Chair Andrea Bonesteel and Co-Chair Mary Jo Long-Davis

Chairperson of the Year Award
- Andrea Bonesteel

GRC-2016-C-629 Photo by Marvin Smith

Left to right: Long-Davis, CFC co-chair; Carol McClain, North Coast CFC (NCCFC) campaign manager; Bonesteel, CFC chair; and Free hold the big check that will make a big difference in the lives of those in need.

Emergency and Inclement Weather Lines
Lewis Field: 216–433–9328 (WEAT)
Plum Brook Station: 419–621–3333

National Aeronautics and Space Administration

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April 2016 Calendar section deadline: March 17, noon
News and feature stories require additional time

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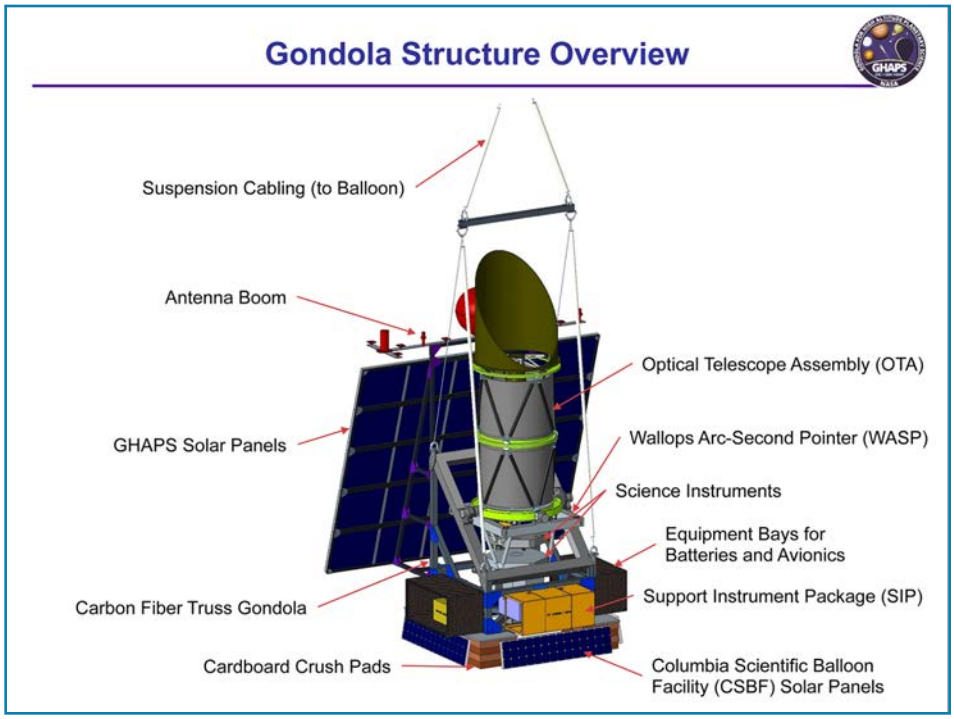
Read AeroSpace Frontiers online at http://www.nasa.gov/centers/glenn/news/AF/index.html

Glenn Leads Planetary Science Balloon Platform Development

NASA Glenn is leading a multi-center team to develop the capability to answer critical questions posed in NASA's Planetary Science Decadal Survey, using a low-cost, balloon-borne observatory with a 1-meter telescope. The project, Gondola for High-Altitude Planetary Science (GHAPS) recently passed a critical mission concept review/systems requirement review (MCR/SRR).



GHAPS builds on Glenn's experience with the Balloon Rapid Response for ISON (BRRISON) in 2013 and Balloon Observation Platform for Planetary Science (BOPPS) in 2014 balloon projects, expanding the offering for planetary scientists to include long-duration missions. GHAPS is designed for a minimum of five flights, up to 100 days in duration, with minimal maintenance between flights.

"A competitive process will be used to select investigators based primarily on proposed science. The platform will be designed to provide room for secondary payloads to test future technologies and instruments," said Monica Hoffmann, Glenn's GHAPS project manager.

With completion of the MCR/SRR, the team is pursuing further analysis and refinements in readiness of a preliminary design review later this year. Hoffmann said the plan is to use the Plum Brook Station B-2 Thermal Vacuum Facility to test the 19-foot-tall gondola prior to flight. The GHAPS team also is developing a visual balloon simulation tool that enables dynamic mission planning by tracking the observatory power and data storage relative to mission targets and communication links.

"We're on the cusp of new technology in balloons that will be applicable across a broad range of missions," Hoffmann said. "The first flight is planned to launch fall 2019 from Fort Sumner, New Mexico."

NASA's Marshall Space Flight Center, Goddard Space Flight Center, Wallops Flight Facility and Balloon Program Office are collaborators on the project.

By S. Jenise Veris