

GRAA NEWSLETTER
P.O. Box 1184, Greenbelt, MD 20768-1184

June 2024 <https://GoddardRetirees.org> 40th Year of Publication

UPCOMING LUNCHEONS: We meet at 11:15 AM on the 2nd Tuesday of each month at the American Legion Post #136 at 6900 Greenbelt Road. **Reservations are required;** please contact graalunch@gmail.com (preferred) or call (410)-709-8889 **before Thursday, June 6.**

June 11	 Tom Statler. Program Scientist; NASA’s Planetary Defense Coordination Office. <i>“How (and Why) NASA Moved an Asteroid: Planetary Defense and the DART Mission”.</i>
July 9	 Bob Menrad, Associate Director of Flight Projects for Exploration and Space Communications. <u>“GSFC Comm & Nav: A Decade of Accomplishments”.</u>

Comments from Tony Comberiate and Arlin Krueger

Dr. Keith Noll, Project Scientist for the Lucy mission, gave an exciting visual description of the asteroid encounters they have experienced since launch on October 16, 2021, on an Atlas-5 rocket. Lucy is not an acronym like most NASA missions, but is named after the paradigm-shifting fossil Lucy who lived 3.2 million years ago.

The Trojan asteroids are primordial material captured in two neutral-gravity Lagrangian points *preceding* (L4) and *following* (L5) in Jupiter’s orbit of the Sun. These Trojan “fossils” are the “lucky” few survivors of a chaotic phase of giant-planet formation preserved in stable orbits for the last 4 billion years. The main objective of Lucy is to explore the diversity of the Trojans. The spacecraft will visit both Trojan groups over the next decade, with two rehearsals on main asteroid belt objects in 2023 and 2025 on its way to Trojan encounters from 2027 to 2033.

Lucy’s instruments include APL’s L’ONG Range Reconnaissance Imager (L’LORRI), Goddard’s L’Ralph package that combines their Multispectral Visible Imaging Camera (MVIC) and Linear Etalon Imaging Spectral Array (LEISA), Arizona State’s Thermal Emission Spectrometer (L’TES), and a Terminal Tracking Camera for target centroiding (TTCam), all with origins in prior missions. L’LORRI’s objectives include clear images to understand the geology of asteroids despite their very low reflectivity. L’Ralph will search for organics and hydrated minerals. L’TES measures surface temperature variations to deduce how much dust, sand, and rock is present. The asteroid’s mass is obtained using the Doppler shift of telemetry during transit. That, and the physical size/volume estimates from the cameras, will give the density.

Lucy's Trojan L4 targets include Eurybates and Polymele in August and September 2027, and Leucus and Orus in April and Nov 2028. The L5 targets Patroclus and Menoetius will be visited in March 2033.

The flight path to the Trojans offers opportunities for studies of main belt asteroids and rehearsals of the approach strategy using the TTCam autonomous terminal tracking system. The plan is to get in front of the asteroid and take data as it passes. In January 2023, Dinkinesh, an ordinary 700 m diameter chondrite asteroid in the main asteroid belt, was the target. L'LORRI images show an extremely angular body with a very prominent ridge, and a retrograde spin normal to the solar system plane. A smaller asteroid, Salam, is in a retrograde orbit around Dinkinesh. This 500 m by 220 m asteroid orbits about 3.1 km from Dinkinesh and its brightness varies with a rotational period of ~ 53 hours. This may be an example of the so-called YORP effect, an important factor in the evolution of small asteroids. Sunlight pressure torques small irregular asteroids, changing their spin rate. Over millions of years they can spin fast enough to be disrupted by centrifugal force.

Lucy's next gravity-boosting Earth flyby will be on December 13th to put it on a path to the L4 Trojans. On its way, it will pass by another main belt asteroid, Donaldjohanson, on April 20, 2025. There the team will stage a full dress rehearsal with a full variety of observations. On August 12, 2027, Lucy will fly by its first Trojan asteroid, Eurybates, which is much larger (~70km diameter) and has a moon.

DIRECTORIES AND NEWSLETTERS: Send your email address to goddardretirees@gmail.com. to get our monthly Newsletters. Past Newsletters and links to videos of the talks are on our website <https://goddardretirees.org>. Quarterly abstracts of Newsletters are mailed to the retirees with only residential addresses in our files. We depend on retirees to furnish their home addresses to be listed in the biennial GRAA Membership Directories, which are only available as mailed hardcopies to members. Donations to GRAA support these mailings, P. O. Box 1184, Greenbelt, MD 20768-1184.

TREASURER'S REPORT: Treasurer Jackie Gasch received donations from Stephen Moran, Ken Dolan, and John Millman in memory of Ray Saxton and all those gone from the GRO Project.

FROM THE GODDARD ARCHIVES: On June 5, 1969 Thor-Agena launched OGO-6, the last of the Orbiting Geophysical Observatories. It was primarily a Fields and Particles observing and measuring satellite with 25 instruments.

REMEMBERING OUR FORMER COLLEAGUES:

Robert H. "Bob" Adams, 92 of Louisville, Kentucky passed away on Wednesday, May 15, 2024 at his home. After graduating from high school, Bob served in the U.S. Navy specializing in Aviation Electronics. After his service in the Navy, he obtained a Bachelor of Science in Electrical Engineering degree from the University of Kentucky in 1959 and then went to work for AVCO Corp. on the Sage Radar System and then for the RCA Missile Test Project at the Patrick Air Force Base from 1961-1963. He worked for NASA at Goddard as an electrical engineer from

1963 until 1989. A memorial visitation will be held from 11 AM – 2 PM on Saturday June 1, 2024 with a 2 PM memorial service to follow visitation at Arch L. Heady & Son at Westport Village, 7410 Westport Rd., Louisville KY 40222. An inurnment will take place at 10AM on Monday, June 3, 2024 at Resthaven Memorial Park. Donations in his memory may be made to the [WHAS Crusade for Children](#).

Jeff de La Beaujardière, 60, passed away peacefully at home in Boulder, Colorado on November 16, 2023. Jeff was born on August 30, 1963 in Paris, France, moved to the US in 1967 and spent his career at NASA, NOAA, and NCAR supporting open standards of Earth science data, making it more discoverable, accessible, documented, interoperable, citable, curated for long-term preservation, and reusable by the broader scientific community, external users and decision-makers. In 1994 he joined Goddard as the Webmaster of NASA's Public Use of Remote Sensing Data Program.

Richard K. Buehler, 93, passed away on Monday, May 27, 2024 at his home in Bowie, MD. Richard was born on January 11, 1931 in New York. After serving in the United States Army Signal Corps, he became an electrical engineer and began his career at Bell Labs, first in New York and then in New Jersey. In the early 1960s, he joined the communications control team at Goddard and worked on many of the Apollo missions, even attending one lift-off. He eventually took a position with the National Security Agency and remained there until his retirement.

Pamela A. Brown, 75, passed away on May 3, 2024. Pam graduated from DuVal High School and had a long career at Goddard working in the Test & Evaluation Division, the Project Support Division, and the Personnel Services Branch. A service will be held on June 15 at 2 p.m. at Holy Cross Lutheran Church, 6905 Greenbelt Rd., Greenbelt, MD 20770-3301. In lieu of flowers, a donation in her name should be sent to [Holy Cross](#).

William H. Browne, Jr., 82, of Rock Spring, GA passed away peacefully on April 30th. Born on June 27, 1941, he graduated as a Mechanical Engineer in 1964 from Cornell University and worked at the Westinghouse Aerospace Division for three years before joining Goddard. His work at Westinghouse included the development of the lunar TV used on the first moon landings and on the Air Force Phantom F4 radar employed during the Vietnam War. He retired from NASA in 2008.

Margot Anne Davison, 82 of Murrells Inlet, SC, passed away on April 28, 2024. Margot was born in Ben's Run, WV on January 5, 1942, and worked as a secretary in Parkersburg, WV, before coming to Goddard where she met her future husband, Ray, who preceded her in death after 58 years of marriage.

Julia "Judy" Marie (Myers) Hanes, 84, passed away peacefully in Frederick, MD, on Thursday, April 11, 2024. She was born on March 7, 1940. Julia worked in Goddard's Budget Branch in the 1970's and was known for her grace, wit, and fashion. Julia had a strong work ethic and was a

dedicated federal employee beginning at the FBI, before her time at Goddard and eventually to Fort Detrick, where she retired as a Senior Budget Analyst.

Guillermo Ernesto (Ernie) Rodriguez, 86, passed away on May 3, 2024, in Solomons, MD. Ernie was born March 10, 1938 in San Jose, Costa Rica and raised in the U.S. Panama Canal Zone. He began his career at the Naval Ordnance Laboratory in White Oak, MD in 1960, transferred to Goddard in 1962, and worked there until his retirement in 1993. Ernie was the quintessential engineer, finding joy in the challenges of understanding, designing, and building things. Beginning with Model A hot rods on the streets of Gatun in high school, he later focused on power systems for the IMP satellites, which led to applications in the Apollo, Shuttle, ISS, and Hubble Programs. His career was marked by his innovative designs and contributions to the field at a time when space exploration and supremacy were at the forefront of human curiosity and scientific advancement.

Edward Stoner Shaffer, 80, died of pancreatic cancer of Millersville, MD on October 14, 2023. Born on November 20, 1942, in Pittsburgh, PA, he received a B.S. in Mathematics, an M.S. in Applied Mathematics, and an M.S. in Computer Science at Johns Hopkins University. At Goddard he worked as a programmer/analyst on the Apollo Space Program, and later with various NASA contractors on custom software projects for the capture and processing of telemetry data from manned missions and scientific satellites.