GRAA NEWSLETTER

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

***October* 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, October 3.**

October 8	 **Peter Hughes**, Chief Technologist, NASA Goddard **"Goddard's Technology Development Program"**
November 12	 **Dave Mitchell**, Agency Chief Program Management Officer, NASA HQ **"Reflections from my Goddard journey and a new view from NASA Headquarters"**

COMMENTS FROM TONY COMBERIATE AND CARL STAHLE

Our September speaker was George Chiu, the Double Asteroid Redirection Test (DART) Mission Operations Manager at the Johns Hopkins Applied Physics Laboratory. His talk, entitled "DART: Operational Challenges for the First Planetary Defense Test Mission", gave us an insider's view of the world's first planetary defense technology demonstration that validated a technique of deflecting an asteroid using a kinetic impactor spacecraft. Hazardous asteroid diameters can vary in size from 4 meters, which occur about once per year, to around 1 km which occur every 500,000 years, and up to 10 km, which occur once in 100 – 200 million years and would cause global devastation. NASA's Planetary Defense Coordination Office funded and supervised the mission, while APL built and managed the spacecraft. The US's Planetary Defense Coordination Office operates ground and spaced based observatories that detect and track asteroids. Then, they are characterized by the Infrared Telescope Facility, Goldstone Solar System Radar, NEOWISE space telescope, and when necessary, a plan is generated to mitigate any threat to Earth. To validate this process, the binary asteroid Didymos, about 7 million miles from Earth, was chosen as the target. The Dimorphos asteroid (163 m diameter) orbits around Didymos (780 m diameter) with a period of about 12 hours. The DART mission's objective was to target Dimorphos, change its orbital period, and measure that period change from Earth. The DART mission included the Didymos Reconnaissance and Asteroid Camera (DRACO), which worked with the Small Body Maneuvering Autonomous Real Time (SMART) navigation system

to properly maneuver DART to hit the target and capture images of the impact. Post impact photos were taken by the LUCIA cubesat, which was carried by the DART spacecraft and released before impact. DART was launched on November 24, 2021, on a SpaceX Falcon 9 rocket from Vandenberg Air Force Base and precisely hit the Dimorphos target within 25 meters of the center on September 26, 2022. The impact changed the orbital period of Dimorphos from 11 hr 55 min to 11 hr 23 min. The deflection was a result of the kinetic impact as well as the tons of asteroidal rock displaced by the impact and launched into space called "ejecta." This effect caused a momentum enhancement factor of ~ 3.6. George presented several photos and movies of the final minutes of the mission up to impact, as well as post impact photos taken by the LUCIA cubesat. The success of the DART mission advances theoretical models which predict the effectiveness of kinetic impactors and how they can be used to deflect larger Earth-bound asteroids. Dimorphos was composed of relatively soft material so other deflection techniques continue to be studied to address harder types of objects that could be a threat to Earth.

DIRECTORIES AND NEWSLETTERS: Send your email address to goddardretirees@gmail.com. to get our monthly Newsletters**,** which include synopses of the talks, special community announcements, and obituaries. Past Newsletters and links to videos of the talks are on our website https://goddardretirees.org. Multi-month 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, only available as mailed hardcopies to members. These mailings are supported by donations to GRAA, P. O. Box 1184, Greenbelt, MD 20768-1184.

TREASURER'S REPORT: Treasurer Jackie Gasch received donations from Jim Fisher, David Batchelor, Barbara Gilmore and Bill Townsend.

FROM THE GODDARD ARCHIVES: On October 5,1984, Shuttle Challenger STS-41G deployed Earth Radiation Budget Satellite (ERBS) to investigate how energy from the sun is absorbed and reradiated by the earth. Designed as a three-year mission, it operated for 21 years.

REMEMBERING OUR FORMER COLLEAGUES:

Keith Alan Brenza, 69, died on May 30, 2024. Born on December 8, 1954, Keith spent a majority of his professional career working as a Mechanical Integration Technician at Goddard.

Betty Albrecht Colhoun, 82, died on September 17, 2024. Born on October 9, 1941, she was a mathematician with the National Security Agency before becoming an authority mathematician on the Apollo Moon Mission and the Hubble Space Telescope, ultimately, receiving the NASA Silver Snoopy Award.

William "Bill" Eichhorn, 78, died on September 6, 2024, at his home in Bowie, MD. Born on November 13, 1945, in Fort Benning, GA, Bill dedicated over 50 years to NASA as a Lead Optical Engineer in which he played key roles in the development of instrumentation for COBE (FIRAS)

and the Hubble servicing missions, including leading the highly successful NASA Goddard Independent Verification Team for HST and several other projects.

Isidore "Larry" Goldberg, 100, died on September 3, 2024. Larry worked at Goddard from August 1961 until his retirement on April 3, 1992. His specialty fields were infrared radiation and optics and he contributed to the development of the 80 K two-stage radiant cooler breadboard and HgCdTe detectors used on Integrated Test and Operations System (ITOS) and Application Technology Satellite F (ATS-F)/Very High Resolution Radiometer (VHRR). He also worked on the design of the low-pass pre-sample filter that was used on the Landsat/Thematic Mapper, the ITOS/Vertical Temperature Profile Radiometer (VTPR) and the Temperature Humidity Infrared Radiometer (THIR) Nimbus systems, and ERTS/Landsat sensor programs, the High Resolution Infrared radiometer (HRIR) and Micro Rain Radar (MRR) radiometers, and the horizon scanners for the Nimbus D and Orbiting Geophysical Observatory (OGO) B satellites. He received numerous awards while at Goddard, including an Exceptional Performance Award in 1975 for "development of advanced earth observation sensors and for analytical efforts which resulted in the significant improvements of the scientific instruments for the Atmosphere Explorer C."

Howard Kent Hills, 85, died on September 10, 2024. Born on September 21, 1938, his career was inspired by his advisor, Dr. James Van Allen. While working at Rice University, he and his colleague were principal investigators who developed the Suprathermal Ion Detector Experiment instruments, carried on the Apollo 12, 14, and 15 missions, deployed by astronauts, and left on the moon. The experiment made headlines in 1971 for detecting the first evidence of water vapor on the moon. He went on to have a long career as a chief scientist at Goddard's National Space Science Data Center.

Edmond Charles Holweck, 92, died on September 13, 2024. Born on December 14, 1931 in Hamburg, Germany, he began his professional career as a Draftsman at Harry Diamond Labs, before working in both Goddard's Technology Applications Center and the Simulations Operation Section, until his retirement.

Frank D. McCluer, 88, died August 28, 2024, in Eagle, Colorado after contracting pneumonia and suffering complications. He was born in Warren, OH, July 30, 1936. He graduated from John Carroll University in 1958. In 1960, he joined Goddard as an electrical engineer for tracking stations around the globe. Among the missions he assisted were the Apollo and Space Shuttle missions. After retiring in 1997, he moved to Vail, Colorado and followed his passion for skiing.

Ernst Sigmund Selig, 102, died on August 29, 2024. Born in Mannheim, Germany in 1922, Mr. Selig emigrated to the United States in 1937, served in World War II and the Korean War, where he was awarded the Purple Heart; Bronze Star with cluster; Army Commendation Medal; African, Mediterranean, and European Theater Ribbons with six battle stars; Combat Infantry Badge; and a few other ribbons. After retiring from military service in 1968, Mr. Selig worked at Goddard five years as a Test Programmer.

Richard Anthony Shehadi, 69, died on August 24, 2024. Richard was born September 17, 1954, and worked in information technology at various places in the Washington, D.C. region, including Goddard and Prince George's County Hospital.