THE INNOVATION CATALYST

NOVEMBER 2021

LUCY'S IN THE SKY! (with diamonds)

NASA's Lucy spacecraft successfully launched on October 16th, starting a four-billion-mile journey to study the Trojans, swarms of asteroids in Jupiter's neighborhood thought to be remnants from the formation of our solar system.

The mission is staged to be a remarkable step for many reasons: not only is Lucy the first to study the Trojan asteroids, but its primary mission is also expected to last 12 years, making it NASA's longest yet. Furthermore, thanks to an "opportunistic trajectory," Lucy will visit a record number of asteroids—a total of eight. No other mission in history has traveled to as many destinations in independent orbits around the sun!

Lucy's exploration of the Trojans relies on a suite of remote sensing instruments:

L'LORRI

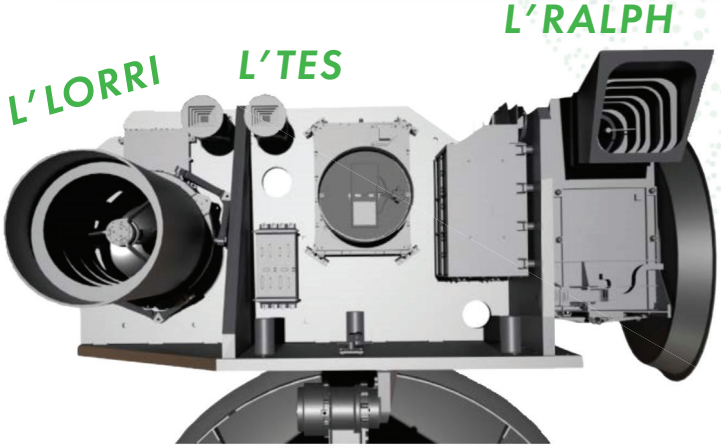
The Lucy Long Range Reconnaissance Imager: Lucy's most sensitive and highest resolution camera, able to produce clear images of the asteroids despite their extreme darkness.

L'TES

Lucy Thermal Emission Spectrometer: detects the asteroids' infrared radiation, taking temperature measurements at various points.

L'RALPH

L'Ralph consists of a color visible imager and infrared spectrometer, and will search the surfaces of the Trojan Asteroids for organic compounds, ices, and hydrated minerals.



GODDARD HIGHLIGHT: L'RALPH

Built at Goddard, L'Ralph is an improved version of *Ralph*, the *New Horizons* instrument that has provided us with incredible images of Pluto. L'Ralph it's really two instruments in one: a Multispectral Visible Imaging Camera (MVIC) and a Linear Etalon Imaging Spectral Array (LEISA). The two work together to analyze the asteroids' surfaces, taking massive photographs that L'Ralph will store in its 256 gigabits of onboard memory.

The onboard memory was just one of the upgrades to L'Ralph. To limit the number of moving parts in the instrument, most of L'Ralph is made from a single block of aluminum. This approach avoids defocusing and other potential problems caused by temperature changes, as using the same material ensures that all parts expand and contract at the same rate. Even the mirrors in L'Ralph are made of aluminum: the metal was turned into a highly polished, smooth surface with diamonds.

Goddard innovators also contributed to the instrument: Daniel Bae and Juan Rodriguez Ruiz (Code 545) developed a mechanical heat switch to assist temperature transitions for L'Ralph during its thermal vacuum tests. Their AZQ (active zero-Q) system combines existing components into one for faster thermal transitioning, allowing engineers to couple and decouple external conductors at will, while also minimizing thermal disturbances to the instrument.

NP-2021-10-713-GSFC

TARDIS DAY

NOV. 23

NASA & THE DOCTOR

NASA and the world's favorite Time Lord have quite a bit of shared history. To be fair, a lot of it involves stolen space shuttles or sabotaged Mars rovers (the latter preventing the discovery of a pyramid on the Red Planet).

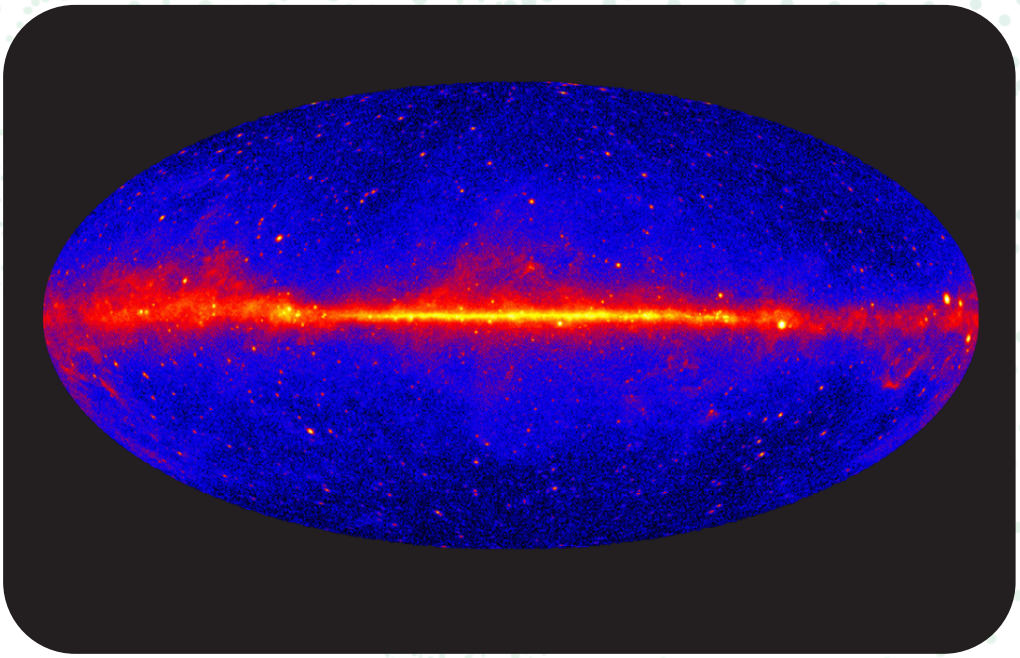
But not all of it is science-fiction: NASA has confirmed a sighting of the TARDIS—the Doctor's vessel for interdimensional travel— in the skies!

Well, maybe not quite. In 2018, scientists named a gamma-ray constellation after the TARDIS (short for Time and Relative Dimension in Space) to celebrate ten years of the Fermi Gamma-ray Space Telescope. The iconic time-traveling police box is now one of 21 unofficial constellations in the gamma-ray sky, along with the Hulk, Godzilla, the Starship Enterprise, and many other recognizable figures from history and pop culture.

The TARDIS may make traveling through time and space pretty simple for the Doctor, but in this universe, scientists had to come up with other ways to look into our past. Studying distant objects in our universe with Fermi is one of them, as light from gamma-ray bursts can take a billion or more years to reach us.
Fermi looks at gamma-ray emissions from supermassive black holes, merging neutron stars, supernova explosions, and other universe phenomena that generate immense amounts of energy. Gamma-ray emissions are invisible to us, but Fermi's observations now allow us to map out thousands of gamma-ray sources. You can check out those sources, as well as the TARDIS and all the other gamma-ray constellations on Fermi's interactive webpage *here*.

DID YOU KNOW?

The very first episode of Doctor Who aired on the BBC on November 23, 1958. In 2018, Whovians designated the date as TARDIS Day to commemorate the series' 50th anniversary, and celebrations continue to this day. That same year, NASA unveiled a new, unofficial gamma-ray constellation named after the TARDIS! You can check it out *here*.



National Aeronautics and Space Administration

STRATEGIC PARTNERSHIPS OFFICE PRESENTS

INNOVATOR HOUR

Do you have questions about protecting your innovation? Do you want to learn more about how to submit New Technology Reports? Do you have general questions about technology transfer or partnerships?

SPO can help you!
Sign-up for an Innovator Hour timeslot and get 1:1 time with SPO!

NOVEMBER 9th FROM 1:00 P.M. TO 2:00 P.M.
MICROSOFT TEAMS

To sign up for the session on November 9th, 2021, please fill out this form. Available time slots are 1:00 p.m. to 1:20 p.m., 1:20 p.m. to 1:40 p.m., and 1:40 p.m. to 2:00 p.m.

INNOVATOR SPOTLIGHT

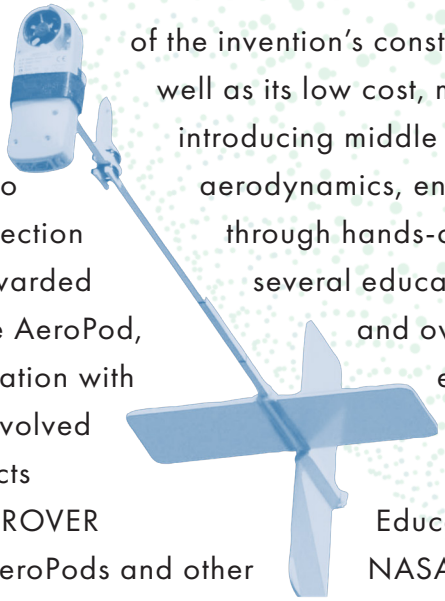
GEOFF BLAND

Geoff Bland began his NASA career in 1979. Today, he's a research engineer at Goddard's Wallops Flight Facility, focusing on the development of small, unmanned aircraft and instrument systems for Earth Science research.

TECH HIGHLIGHT: AEROPOD

Satellites and drones may be great tools for data-gathering, but they can also be a bit complex—not to mention expensive. Luckily, Geoff Bland has a knack for making things simple.

The AeroPod, patented in 2012 as the "Aerodynamically Stabilized Instrument Platform," is a lightweight, aerodynamic stabilization device that can hitch a ride on simple kites and attach to data-collection devices such as cameras and sensors—making them stable enough to collect data from above. It is both affordable and uncomplicated, with no moving parts.



The simplicity of the invention's construction and operation, as well as its low cost, made it a useful learning tool, introducing middle and high-school students to aerodynamics, engineering, and remote data collection through hands-on activities. Goddard has awarded several educational licenses for the use of the AeroPod, and over the years, Bland's collaboration with educational institutions has evolved into NASA-supported projects like the AEROKATS and ROVER Education Network (AREN), using AeroPods and other NASA technologies to foster science-learning activities. Read more about AREN *here*.

BY THE NUMBERS

As of 2021, Geoff has contributed:

- 16 NTRs
- 2 Patents
- 13 Licenses

AWARDS & HONORS

- 2014 GSFC James Kerley Award for Technology
- 2020 FLC Mid Atlantic Regional Award (Educational Institution and Federal Laboratory Partnership)
- 2021 FLC Technology Focus Award

National Aeronautic and Space Administration

THE COFFEE BREAK

Patenting by: Josh Levine

NOVEMBER 14TH
1:00 P.M. – 2:00 P.M.

The Strategic Partnerships Office (SPO) invites the Goddard community to attend "The Coffee Break"

This session will focus on the patenting process. Josh Levine will lead the session and answer your questions about all topics related to the patent process.

For more information on how to submit your new technology report, visit https://invention.nasa.gov/.

www.nasa.gov

SPO WORD SEARCH

R E I L F I Y Z W J N H D G S G D S X W H I W
X Z D Y D R D U H P Q V E Y G Y B H T P K I K
O Z Y C G J G M K D R A D D O G U N T T W L G
I T H E S P A R K H N B W Q V V U G I U W E Q
J N E W T E C H N O L O G Y R E P O R T S I L
A T F Q V R M W O W O Z A K A O U Z P M O P S
M M D J F R T H E C O F F E E B R E A K C X Q
E U R I N N O V A T I O N N D M B U X M L Z O
S R M B B M T J U S J Z X V U I J O P Y Q X T
K Y T E C H N O L O G Y M A N A G E R S V S J
E P U O V Y Y M W Q I S G E C K U C X X R W B
R A P X Z S E B I N N O V A T O R H O U R J E
L T H E I N N O V A T I O N C A T A L Y S T J
E P M R J Z F P P A R T N E R S H I P S O M J
Y M O R E F S N A R T Y G O L O N H C E T K Y
E E O B J L S E I G O L O N H C E T R R C L J

WORD BANK

Goddard
Innovation
Innovator Hour
James Kerley
New Technology Reports
Partnerships
SPO
Technologies
Technology Managers
The Coffee Break
The Innovation Catalyst
The Spark

UPCOMING EVENTS

Innovator Hour: November 9th 1:00 p.m. - 2:00 p.m.

Coffee Break: November 16th 1:00 p.m. - 2:00 p.m.