

THE INNOVATION CATALYST

JULY
2021

GODDARD'S COMPACT THERMAL IMAGER WINS NASA'S INVENTION OF THE YEAR AWARD

It's been an eventful few years for the Goddard-developed Compact Thermal Imager (CTI). In 2019, it received its first patent license, and in 2021, the CubeSat compatible thermal imager was named co-winner of NASA's Invention of the Year Award: honoring inventions that significantly contributed to NASA programs.

NASA recognized inventors Murzy Jhabvala, Donald Jennings, and Compton Tucker for their patent "Compact, High Resolution Thermal Infrared Imager," which was submitted in 2014 and issued in 2019. This patented concept served as the basis for the CTI instrument that flew with Robotic Refueling Mission 3 from late 2018 to 2019 aboard the International Space Station. Over the course of several months, CTI captured more than 15 million infrared images of Earth in two spectral bands.

"I'm thrilled to see CTI acknowledged in this way," Jhabvala said of the NASA Invention of the Year recognition. "It's very gratifying to me and the team that NASA recognizes and utilizes this technology, particularly given some of the challenges we overcame to get to this point."

The technology, conceived by Jhabvala at Goddard, is small enough to fit on miniaturized satellites, such

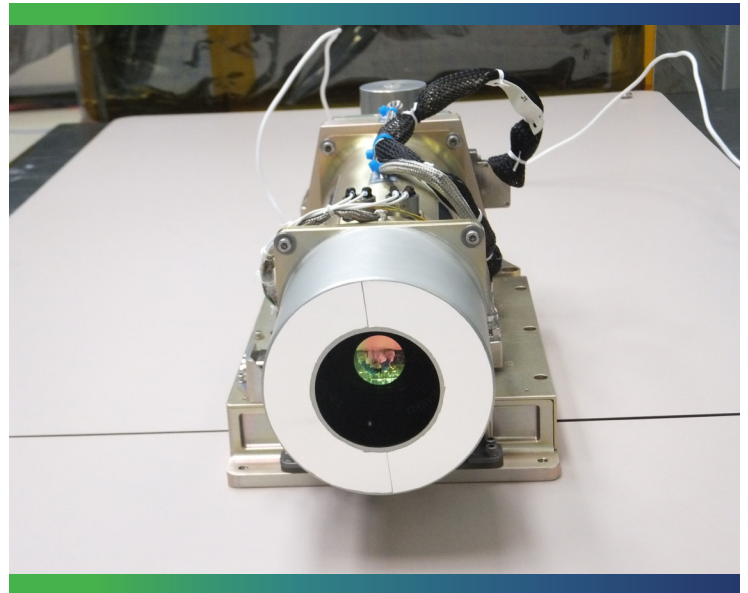


Photo courtesy NASA/Murzy Jhabvala

as CubeSats, and represents the latest advances in infrared detectors. Funded by NASA's Earth Science Technology Office (ESTO) and bolstered by technology developed through the Small Business Innovation Research (SBIR) program, CTI represents many years of collaboration and innovation.



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CTI's emerging strained layer superlattice (SLS) infrared detector technology — developed in 2012 and 2013 using Goddard's Internal Research and Development (IRAD) funds — possesses several advantages over other competing infrared technologies. SLS detectors share qualities with quantum well detectors, such as low cost, relative ease of fabrication, and stability; however, they are 10 times more sensitive, can be spectrally tuned, and can operate at much warmer temperatures. This allows the technology to fly on smaller platforms, since it can work with lighter and less power-intensive cooling systems.

CTI's technology pathfinder mission leveraged the collaborative efforts of multiple Goddard directorates as well as miniature integrated detector cooler assembly development by New Hampshire-based QmagiQ LLC, funded through NASA's SBIR program. ESTO supported and funded CTI instrument development under the Sustainable Land Imaging Technology program.

ESTO has funded a follow-on instrument, CTI-2, which is currently in development. CTI-2 will incorporate optical filters directly attached to an SLS detector that provides multi-spectral data. Two additional internal Goddard programs are supporting the development of detectors and instruments with different filters attached to the SLS detector assembly.

CONGRATULATIONS TO MURZY JHABVALA, DONALD JENNINGS, AND COMPTON TUCKER FOR MAKING GODDARD PROUD!

CTI's inventors would also like to recognize important contributions from the following members of the CTI team, who helped develop the instrument that flew in space and processed the resulting data:

Anh La, Beth Keer, Elizabeth Timmons, Robert Stone, Thomas Flatley, Frank Cepollina, Sachidananda Babu, Allen Lunsford, Justin Cassidy, David Parker, Mani Sundaram, Jason Bundas, William Squicciarini, Paul Finneran, Ireneusz Orlowski, Chris Fetter, and Markus Loose

MOLECULAR ADSORBER COATING WINS RUNNER UP IN NASA'S INVENTION OF THE YEAR AWARD

Congratulations to the Molecular Adsorber Coating (MAC) team for this recognition!

MAC is a zeolite-based sprayable coating that mitigates molecular contamination in spacecraft and instruments by adsorbing potentially harmful molecules. Molecular contamination can derail a mission – even the smallest deposition of a chemical species on a sensitive telescope mirror can keep it from working properly. Contaminants can be mitigated using zeolite, a mineral with open pores or cavities that can capture molecules passively.

MAC improves on an older technology called the adsorber puck system, which featured bulky, honeycomb-shaped adsorbers that added extra mass and required complex and time-consuming integration. In contrast, engineers can spray MAC directly onto a surface, such as the interior of a spacecraft or on panels that can be placed within instrument cavities.

Compared to adsorber pucks, MAC is lightweight, easily installed, and displays adsorbing capabilities similar to or better than the puck system. MAC has flown on two

NASA missions – the Global Ecosystem Dynamics Investigation (GEDI) and the Ionospheric Connection Explorer (ICON) – and is being considered for future missions.

Additionally, MAC is part of an ongoing partnership with the Smithsonian National Museum of Natural History to determine its efficacy in protecting museum specimens from mercury vapor contamination.

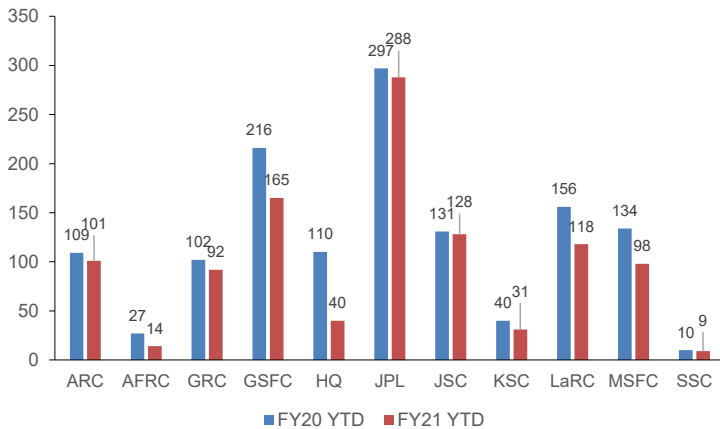
**The MAC team includes:
Nithin Abraham, Sharon Straka, Mark Hasegawa, Wanda Peters, Jack Triolo, Randy Hedgeland, Kevin Novo-Gradac, Alfred Wong, John Petro, and Cory Miller**



Nithin Abraham removes samples treated with MAC from storage cabinets at the Smithsonian's Museum Support Center in Maryland. Photo credit: NASA/Chris Gunn

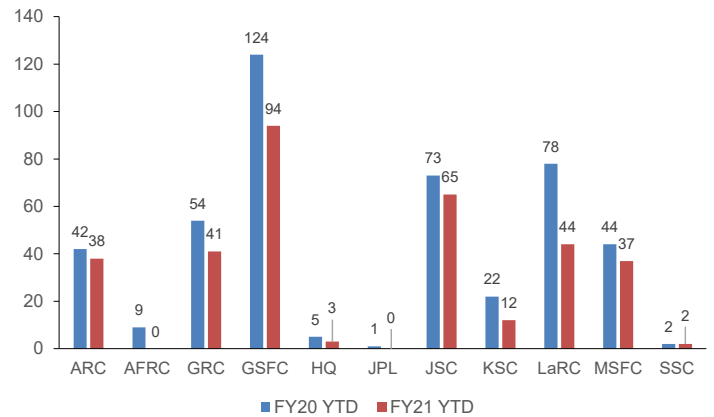
GODDARD NTR METRICS

Fiscal Year to Date



Total Number of NTRs as of July 1, 2021

Fiscal Year to Date



Total Number of NTRs with at Least One Civil Servant Inventor as of July 1, 2021

Goddard's New Technology Report (NTR) numbers soared in the third quarter! As of July 1, 2021, Goddard holds a steady lead in NTRs reported with a civil servant innovator and continues to be in second place for overall NTRs reported. SPO is proud of the outstanding work coming from Goddard's innovator community. Last year, Goddard placed first among all NASA centers for NTRs with at least one civil servant inventor. Let's see if we can maintain our lead two years in a row as we finish out the fiscal year!

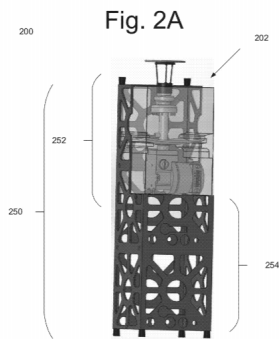
MAKE SPACE FOR YOUR MENTAL HEALTH: SOCIALIZING

For most of 2020, social time took place in the form of video calls and distanced outdoor gatherings. Those types of social activities are better for your mental wellbeing than staying completely isolated, but as vaccinations bring us closer to old ways of life, we can celebrate the benefits of socializing again. According to the [Mayo Clinic](#), "Socializing not only staves off feelings of loneliness, but also it helps sharpen memory and cognitive skills, increases your sense of happiness and wellbeing, and may even help you live longer."

A [longitudinal study by Harvard University](#) found a strong correlation between life satisfaction and relationships with family, friends, and community. These associations rang true for both physical and mental health. Even though it's easy to get busy and overwhelmed by the demands of daily life, keep relationships with those you love at the top of your priority list.

TECH TRIVIA TRANSFER

GUESS THE PATENT DRAWING



CLUE ONE: The technology is small enough to fit on miniaturized satellites, such as CubeSats, and represents the latest advances in infrared detectors.

CLUE TWO: The patent for this technology was granted in 2019.

CLUE THREE: This technology was invented by Murzy Jhabvala, Donald Jennings, and Compton Tucker.

+ WANT TO KNOW THE ANSWERS?

[Click here](#) for Tech Transfer Trivia and [here](#) for the Guess The Patent Drawing.

How much do you know about NASA technology transfer? Find out with our monthly quiz!

Q Which patented Goddard technology with applications in cooling electronics was licensed to a Florida-based company called Protodromics LLC in 2020?

A. SpaceCube

B. MERRA Analytic Services

C. Lotus Coating

D. Microscale EHD Pump

Q **True or False:** There is only one type of license agreement available to licensees of Goddard technology.

A. True

B. False

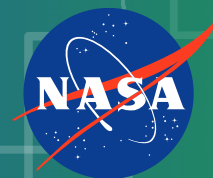
Q What type of technology did Goddard license to Concentric Real Time LLC for search and rescue applications?

A. Spectrometer

B. Receiver

C. Radiometer

D. Altimeter



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!



JULY 21st FROM 1PM TO 2PM
MICROSOFT TEAMS

To sign up for the session on July 21st, 2021, please fill out this form.
Available time slots are 1p.m. to 1:20p.m., 1:20p.m. to 1:40p.m., and
1:40p.m. to 2:00p.m.

[Please click here to fill out the form and reserve your session!](#)

GET TO KNOW SPO **MARCUS PAYNE**



Marcus and his beloved cats, Fred and Franklin.

POSITION:

Project Support Specialist

ROLE AT SPO: Project Support for SBIR/
STTR

YEARS WITH NASA: 3 -- I started as a marketing intern with SPO right after graduating with my bachelor's degree from the University of Montana Western in 2018. I came on full time after that internship and worked with SPO's Tech Transfer and Partnerships functions doing general marketing, events, and graphic design.

FAVORITE PART OF THE WORKDAY: Please see "Most Obscure Talent."

STAR WARS OR STAR TREK? Star Wars, because they have some incredible books in the expanded universe and, for no particular reason, I haven't seen any Star Trek. If you're a Star Wars fan, you should definitely read the Darth Bane trilogy and Darth Plagueis.

FAVORITE QUOTE OR JOKE:

"No matter where life takes me, you can find me with a smile." -- Mac Miller

MOST OBSCURE TALENT:

It's obscure, but not a secret to the SPO office, that I'm actually pretty good at playing hacky sack. I've managed to recruit some other SPO members into playing, and if you came by our offices at lunch time, you might catch us kicking around the hacky sack.

VIDEO GAMES OR BOARD GAMES?

Board games. If my in-laws are visiting, it's likely that we'll play a couple games of Settlers of Catan each night. I'm also a big fan of Risk, but it turns out not many people want to play a board game for eight straight hours.