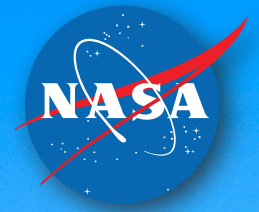


National Aeronautics and Space Administration

THE NRP POST

A Publication of NASA Research Park



2024 Issue 1

AMES RESEARCH CENTER

UC Berkeley NASA
Partnership Inspiring
Next Generation



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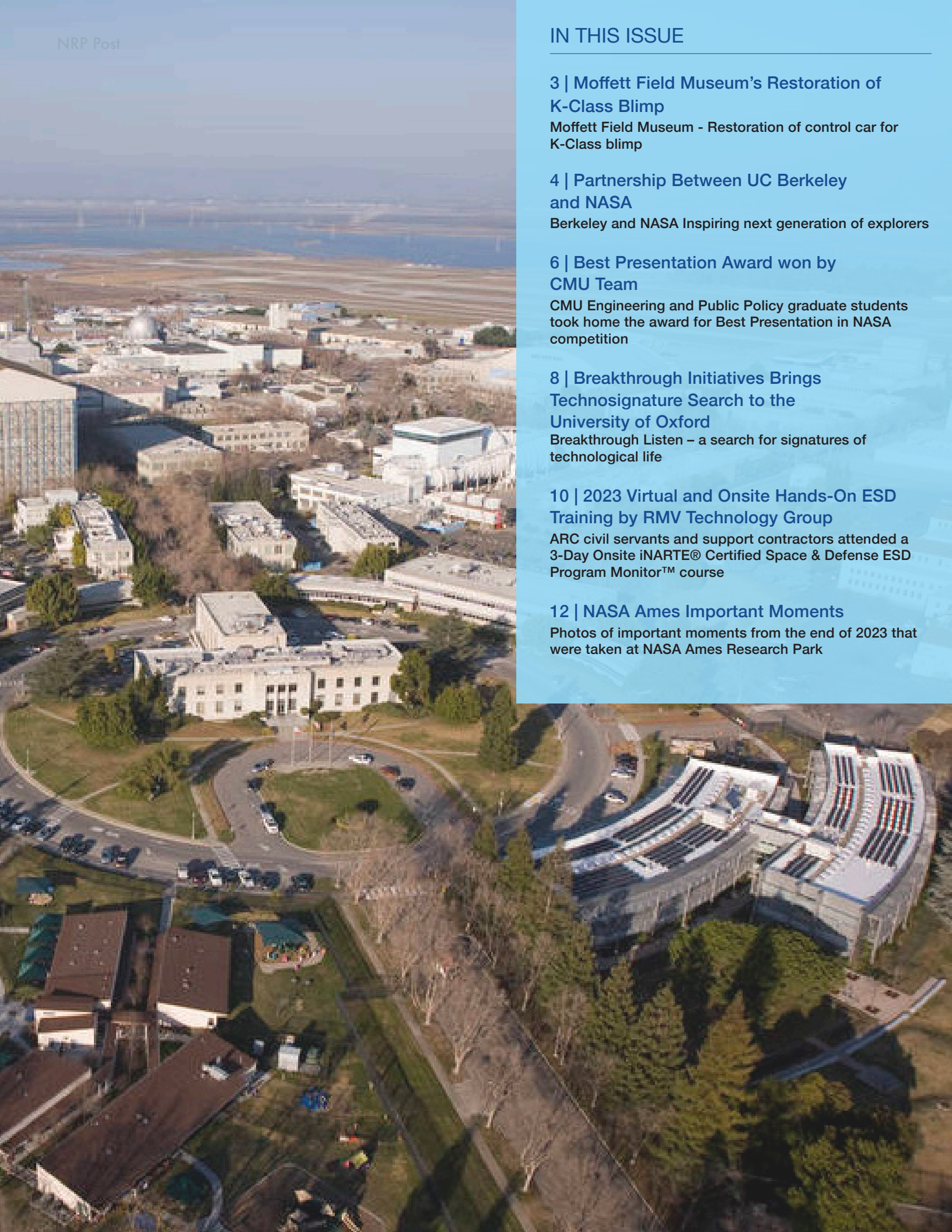
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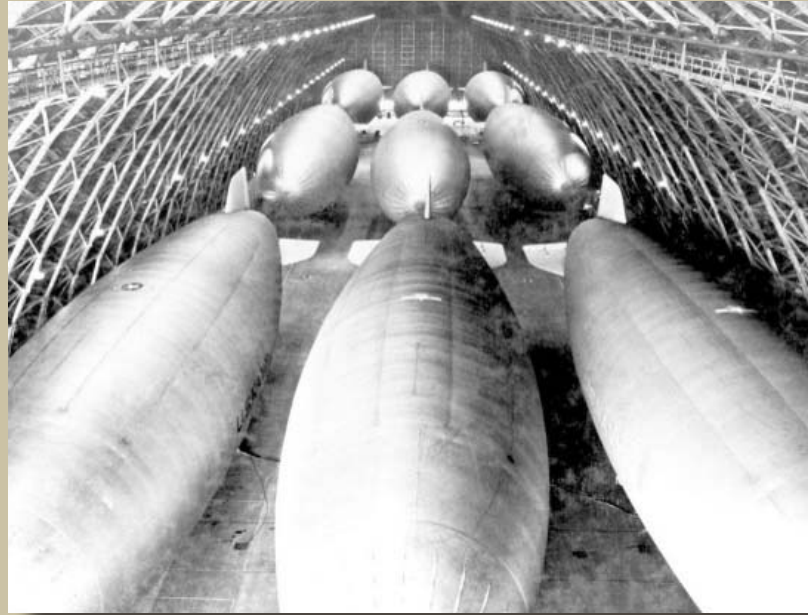


Moffett Field Museum's Restoration of a WWII K-Class Blimp

By Jeff Wasel PhD, Executive Director, Moffett Field Museum,
November 11, 2023

LTA Research, Inc. aren't the only folks who've been busy building LTA (Lighter than Air) projects here at Moffett Field! Since 2014, the Moffett Field Museum has been restoring the control car or "gondola" from K-22, a K-class anti-submarine warfare (ASW) blimp stationed at NAS Moffett Field during WWII. While not as ambitious as building a 400' ridged airship, it's still a significant undertaking, and once completed, will be the only restoration of its kind west of the Mississippi.

Our restoration story starts back in 2014, during the environmental remediation of Moffett Field's iconic Hangar One. During this process, all sorts of interesting items were found tucked away in the recesses of this storied structure, including the salvaged fore and aft sections of K-22's control car from its final crash on April 13, 1943. As a result of that crash, the remaining salvaged parts remained in Hangar One, only to be rediscovered some 71 years later. K-22 was built at the Goodyear Airship Dock in Akron, Ohio, and delivered to NAS Lakehurst, New Jersey on November 4, 1942. She arrived at NAS Santa Ana on November 11, 1942, where she was assigned to Fleet Airship Wing Three, (FAW-3), as part of Lighter Than Air (LTA or "Z") Patrol (P) Squadron 31 (ZP-31), and was the



K-Class blimps in Moffett's Hangar One

first K-type to enter service on the West coast. 9 days later she was accepted by ZP-32 at NAS Moffett Field, where she began her operational career in earnest.

K-22 had a short, somewhat ill-fated operational life, due to several mishaps over her short time in service. K-22's war started on November 22, 1942, when, while commanded by LT. H. R. Hobensack USNR, her crew located a downed Army P-38 Lightning at sea. Her brief service career came to an end, when K-22 struck a hill in the fog at Chittenden Pass near Gilroy, California, on April 13, 1943, while returning to base. As a result, the control car was scrapped in place, and the remains trucked back to NAS Moffett Field. Thus, with 828.2 flight hours, K-22 was stricken off the Navy LTA rolls after only 5½ months of service.

These salvaged sections were then offered to the Moffett Field Museum in 2014, who are restoring the control car to its original 1943 configuration. This restoration project is a significant undertaking, incorporating not only repairing the original crash-damaged sections, but also fabricating all 6 of the control car's missing middle internal skeletal frames from scratch, as well as the entire operational interior. Up until 2017, the project was funded entirely by museum admissions and donations. In 2018, the first of several grants were obtained from the Lennox Foundation.



Completed new build gondola frames mated with frames salvaged from 1943 crash; note beginning of keel framing



NASA Hosts Unveiling of Plans for New Silicon Valley Innovation Hub

Press Release By Rachel Hoover October 16, 2023

A new campus, called Berkeley Space Center, aims to offer lab, office, and educational spaces along with student and faculty housing, a conference center, and retail space on 36 acres within the NASA Research Park at the agency's Ames Research Center in Silicon Valley.

The University of California Berkeley and San Francisco-based developer SKS Partners proposed the new campus and innovation hub for research and advancements in astronautics, aeronautics, quantum computing, climate studies, social sciences, and more during an event on October 16, 2023 at NASA Ames.

Berkeley Space Center follows on a NASA-UC Berkeley partnership created to explore potential mutually beneficial learning opportunities, including accelerating local and national capabilities for transporting cargo and passengers using emerging automation and electric propulsion technologies; examining how biomanufacturing can enable deep space exploration; and leveraging NASA's high-performance computing assets. The new campus aims to bring together researchers from the private sector, academia, and the government

to tackle the complex scientific, technological, and societal issues facing our world.

"The diverse portfolios of NASA Ames and Berkeley open potential future collaborations in a variety of areas including interplanetary exploration, air transportation capabilities, the search for life beyond our planet, and environmental studies for the benefit of all," said Eugene Tu, Ames center director.

NASA Research Park is a world-class research and development hub for government, academia, non-profits, and industry, located at Ames in Moffett Field, California. Ames has a long history of partnering with diverse entities – from space technology start-ups to the Federal Aviation Administration – to combine strengths to tackle great challenges. Through the Berkeley Space Center, UC Berkeley joins



Carnegie Mellon as the second major university to choose NASA Research Park for a new campus.

“The Berkeley Space Center will bring together leading experts in academia, government, and industry to enable new collaboration in aerospace, bioengineering, advanced air mobility, and other areas of research,” said U.S. Rep. Anna G. Eshoo. “Bravo to NASA Ames and UC Berkeley on this watershed moment in the transformation of Moffett Field into an innovation hub and a model for bringing together the brightest minds in academia and government.”

The United States Geological Survey serves as another model partnership at Ames, with development of a new campus collocating at NASA Research Park to support joint research in lunar prospecting, earthquake simulations, ecology, remote sensing work, and more.

“As an advocate for advancing the science and technology ecosystem of the Bay Area, I’m very proud to see this collaboration happening here in Silicon Valley,” said U.S. Rep. Zoe Lofgren. “This is a perfect example of the importance of NASA’s enhanced use

leasing (EUL) authority, which allows us to take full advantage of NASA’s unique infrastructure and capabilities. Everybody benefits when we put smart policies to use, like EUL. The product of this partnership could create jobs, build a collaborative atmosphere, and help train the next generation of STEM leaders. I look forward to following along the progress of the Center’s construction and, one day, touring the Berkeley Space Center.”

Learn more about Ames’ world-class research and development in aeronautics, science, and exploration technology at: <https://www.nasa.gov/ames>

For news media:
Members of the news media interested in covering this topic should reach out to the Ames newsroom.





CMU Team Wins Best Presentation Award at NASA Competition

By Emma Skidmore

A group of Engineering and Public Policy graduate students took home the award for Best Presentation on behalf of the NASA's Gateways to Blue Skies: Clean Aviation Energy Competition.

For a group of Carnegie Mellon University researchers, hydrogen is the future.

Engineering and Public Policy (EPP) graduate students Jon Gordon, Jaih Hunter-Hill, Anna Cobb, and Xiaohan Wu, and CMU Design student Dorothy Li presented their research, "The Role of Hydrogen in Aviation Decarbonization," at NASA's Gateways to Blue Skies: Clean Aviation Energy Competition, winning the Best Presentation award.

The competition, which is sponsored by NASA's Aeronautics Research Mission Directorate's University Innovation Project, "is an initiative to engage college students in researching climate-friendly technologies and applications that will establish a zero emissions future for aviation."

The theme of this year's contest asked students to conceptualize the life cycle of a clean energy option, from source to flight. Presentations were judged on feasibility, viability, and environmental impact.

Gordon said aviation is one of the hardest transportation sectors to decarbonize, but he feels there is real potential for hydrogen as a fuel source.

"We spent time looking into other alternative fuels that we thought could be interesting, but we ended up taking the approach that if we want our work to really mean something, we have to choose what we feel is the most realistic option," Cobb said.

Moving forward, Gordon said their hope is that NASA, the Federal Aviation Administration, and the Department of Energy (DOE) will seriously consider their research and take specific action as a result.

"I hope our research for this NASA competition could provide valuable insights for decision-makers in the aviation industry," Wu said. "Moreover, I also hope this research could bring a heated discussion on hydrogen's role in transportation decarbonization in the academic world." The team summarized their work into a policy brief that they plan to share with the hydrogen and aviation community. Their infographic, and full report are available.

Gordon said the team feels that aviation is not discussed nearly enough in conversations about hydrogen end-users. He explains that the DOE is investing billions of dollars into Hydrogen Hubs—hydrogen production facilities that will be placed in eight to 10 areas across the country. He said if aviation is not part of the conversation as a hydrogen offtaker while these hubs are being created, it will delay hydrogen's role in aviation decarbonization by years.

"If we act now, we can decarbonize aviation much more," Gordon said. "How fast hydrogen is able to penetrate the market of aviation is dependent on the next few years of planning."

Cobb explained the difficulties in decarbonizing aviation include the slow turnover rate for planes (30+ years), fueling infrastructure, and range.

"If we act now, we can decarbonize aviation much more."

Jon Gordon, Graduate Student, Engineering and Public Policy

"Being limited in range and fueling infrastructure introduces difficulties with flight scheduling; certain aircrafts can only fly to certain airports," she said.

Gordon said they anticipate three types of energy sources to replace jet fuel: batteries, hydrogen, and sustainable aviation fuel. Batteries will be used for short-range flights while hydrogen can be used for longer travel times. While airlines have the goal of having net-zero emissions by 2050, Gordon noted they can't reach that goal by using sustainable aviation fuel because it still produces emissions, albeit less than traditional jet fuel.

"We think it's extra important for hydrogen to be part of the solution because it can actually be zero emission," he said.

The team took a four-pronged approach to their research that included a literature review of more than 70 sources, interviews with 13 stakeholders, market share analysis, and a multi-objective optimization model. The goal of the optimization model is to analyze trade-offs between their two objectives: minimizing emissions and minimizing costs.

Peter Zhang, assistant professor of operations research in the Heinz College and team advisor, said he was impressed by how independent and motivated the team was.

"The most impressive part is the amount of details and perspectives they bring into every meeting—a strong indicator of their enthusiasm and work ethic," Zhang said. "In a good project like this, advisors have enough 'ingredients' to work with and can very quickly help them prioritize."

The team also created and defined a supply chain system to illustrate how hydrogen will be transported from hubs to airports.

"With our optimization model, we're able to choose how we want to make hydrogen and, probably more importantly, how we want to move that hydrogen in terms of what's going to be the most cost effective versus emissions intensive," Cobb said.

Hunter-Hill said one of the challenges in their research was coming up with realistic ways to achieve a future that does not yet exist.

"We had to come up with best-case assumptions for the world that could be. I think one of the challenges with that is so much of the analysis that we found is based upon very case-specific studies," Hunter-Hill said. "We wanted to try to account for different outcomes in a world that we can't predict."

Hunter-Hill said the creation of the supply chain process is one of the things that makes their research stand out.

"We're trying to integrate multiple sources of information to create a future that doesn't exist but is realistic to potentially exist," he said.

Doing research in a team environment, Wu said, was inspirational. He explained they were able to split up the work based on everyone's strengths, and he worked on assessing hydrogen's environmental impact by building and solving the model.

"I think the biggest success was team cooperation," Wu said. "Every team meeting was very productive and inspirational, and everyone got and gave a lot of useful ideas in those meetings we had. Every teammate cared about this project very much and devoted 100%."

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BREAKTHROUGH LISTEN



NRP's Breakthrough Initiatives Brings Technosignature Search to the University of Oxford

Breakthrough Initiatives, October 2023

Breakthrough Listen – a search for signatures of technological life beyond Earth – has a new international base at the University of Oxford in the UK. The Listen program is managed by the Breakthrough Initiatives, which is headquartered in the NASA Research Park at the NASA Ames Research Center. As such, the program stands on the shoulders of Astrobiology research giants, many of whom originated from the Ames campus.

NASA and other space agencies have long been involved in the exploration of life beyond Earth, attempting to answer the age-old question, “Are we alone in the Universe?” In the search for signatures of life, much of the focus has naturally been on the markers of biological life, or “biosignatures”. However, since the beginning of the Listen program in 2015, the search for technosignatures –signatures of technological life – has matured into an academically rigorous discipline with a surge in peer-reviewed publications and multiple global partnerships.

This new era was made possible by the pioneering work in astrobiology and exoplanet research by NASA, and

especially the results of the Ames-led Kepler mission which discovered thousands of extrasolar planets and confirmed that Earth-like planets are relatively common in the galaxy. The connection between NASA’s planet finding missions and the search for technosignatures was cemented through Breakthrough Listen’s partnership with NASA’s Transiting Exoplanet Survey Satellite (TESS) via Professor Sara Seager (MIT), Deputy Science Director.

The newly announced partnership with Oxford leverages the university’s astrophysics expertise and brings online new facilities like the MeerKAT and LSST, in addition to developing an innovative Lunar Farside Radio

Observatory. “We are delighted to launch a new era of Listen here at Oxford. This collaboration will be a tremendous fusion of knowledge, resources, and passion to understand our place in the cosmos,” said Dr. S. Pete Worden, Executive Director of the Breakthrough Initiatives and former Director of NASA Ames Research Center.

The partnership coincides with an important new phase for Breakthrough Listen. In 2023, the project will begin working with data from the MeerKAT telescope array in South Africa, which offers unprecedented sensitivity and field of view capabilities. Breakthrough Listen will also utilize data from the Vera Rubin Observatory in Chile, expected to be operational in 2024.

The program will leverage machine learning and AI to analyze massive datasets. In January 2023, a new AI method identified eight previously undetected potential technosignatures.

Breakthrough Listen uses radio telescopes worldwide to scan the skies. Since 2015, it has surveyed thousands of stars, the Milky Way galaxy, and dozens of other galaxies. To date, it has published over 70 papers and discovered 72 Fast Radio Bursts.

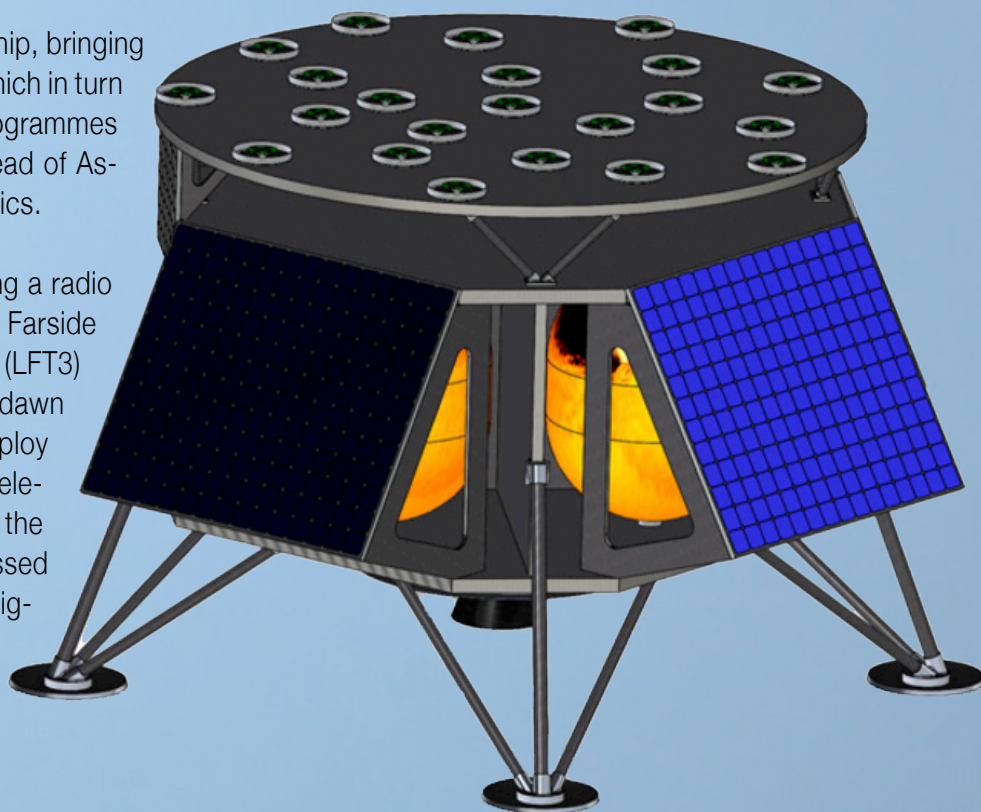
“This is an extraordinarily exciting partnership, bringing a large-scale SETI programme to the UK which in turn greatly enhances our existing research programmes at Oxford,” said Professor Rob Fender, Head of Astrophysics at Oxford’s Department of Physics.

An innovative idea being explored is placing a radio telescope on the lunar farside. The Lunar Farside Technosignature and Transient Telescope (LFT3) would provide a pathfinder survey at the dawn of lunar farside activities. LFT3 would deploy a highly sensitive 3-meter aperture array telescope on the Lunar Farside along with the electronics to process and relay processed data appropriate for cutting-edge technosignature science. Given the optimal location, an array of this size yields significant sensitivity to such signals that is not

achievable anywhere else in our solar neighborhood. The lunar farside represents a unique observational location in our solar system since the Earth is never above its horizon. This means that the RFI environment in which the telescope is immersed is as pristine as possible. Although it is challenging to get sufficient payload to the Lunar Farside, we are at the dawn of an exciting age in which serious Moon-based scientific activity is becoming feasible at a reasonable cost. NASA is spearheading this effort through the Commercial Lunar Payload Services (CLPS) program. Further, LFT3 will follow NASA’s Volatiles Investigating Polar Exploration Rover (VIPER) mission, a mobile robot mission which is scheduled to land at the South Pole of the Moon in late 2024 on a 100-day mission. Developed by NASA Ames, the VIPER mission will help determine how the Moon’s resources can support human activity on the Moon and beyond.

For more on NASA and technosignatures:

<https://exoplanets.nasa.gov/news/1765/searching-for-signs-of-intelligent-life-technosignatures/>





2023 Virtual and Onsite Hands-On ESD Training for the Agency and Defense Contractors was a Huge Success!

Renee Mitchell, President RMV Technology Group LLC, Moffett Field, California December 20, 2023

In March 2023, ARC civil servants and support contractors attended the 3-Day Onsite iNARTE® Certified Space & Defense ESD Program Monitor™ course to meet NASA requirements for ESD workstation requirements to NASA STD. 8739.6B, Chapter 7, taught by Bob Vermillion, RMV CEO/Founder, CPP, Fellow, Certified ESD & Product Safety Engineer-iNARTE.®

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From April 24-28, 2023, the RMV leadership team held a 5-day comprehensive iNARTE® Certified, Aerospace & Defense ESD Engineer™ training course for NASA, DoD and DOE contractors. The RMV leadership with Agency ESD Program Manager support led the individual break-out sessions for ESD Instrument training. An astronomical success!

The iNARTE® ESD Space & Defense training included Class 0Z & 0A Safeguards, ESD Products and Packaging, Material Handling, Long Term Storage & Transport and how to locate ESD Events during manufacturing and assembly before liftoff. Suspect ESD Counterfeit products and protective packaging were also included to demonstrate the high risk of online purchases without verification for Mission Critical projects.

Hands-on sessions to differentiate conforming and non-conforming materials in real time proved to be a real game changer of Supplier products and packaging. Workshops and breakout sessions reinforced the training with safety procedures in place. ESD/ESA Issues and CubeSat Integrity, Equipment Standards, Reliability, Low RH ESD Testing Methods (for harsh environments)



and correct usage of ESD Instrumentation with support Case Studies were highlighted to include ESD Protected Area (EPA) Certification and Verification Measurements for NASA-STD-8739.6B, Chapter 7, ANSI/ESD S20.20 compliance and applicable MIL-STDs for ESD Assessment Practices and troubleshooting of Mission requirements.

In November 2023, the iNARTE® Space & Defense Virtual 3-Day iNARTE® ESD Program Monitor™ course took place from the lab at RMV for multiple NASA centers. In 2021, Bob Vermillion received an Award of Excellence from NASA for the design and development of a Virtual Training platform held in July 2021 during the height of the COVID shutdown.

In cooperation with Exemplar Global, the 3rd party international global certification body, RMV exclusively designed and developed a unique iNARTE® Space & Defense platform of courses for material and product conformance of ultra-sensitive devices that require ESD protection for environmental extremes at each stage from deployment to re-entry from space, the arctic and desert-like conditions, as in theatre and for National Defense that require missile readiness at all times.

RMV courses are intended for Project Managers, Supervisors, Avionics and Quality Engineers, lab technicians, repair depots and Facility Operations where extreme environmental conditions will impact those that package, handle, store, transport and kit EEE sensitive parts for land, air, sea and space for contractor compliance to NASA Standard 8739.6B, Chapter 7, now

required by NASA for all new contracts.

Since 2009, RMV, a NASA Industry Partner and Service-Disabled Veteran Owned Small Business, is located onsite at NASA Ames Research Park. Recently relocated to our new HQ, RMV is just two blocks over from our original location, down the street from the NASA Badging office and one block south of the USGS newly constructed facility. The remodeling and reconstruction of the historic dirigible for GOOGLE can be seen from our front door.

In support of the Agency, RMV is the largest and most advanced ESD Materials and Product Qualification Testing Laboratory on a NASA site in addition to our internationally accredited iNARTE® Training Center for NASA and the DoD to better protect the Warfighter.

For more information on the next On-Site iNARTE® Space & Defense ESD Program Monitor Training Course, please contact Renee Mitchell at 650-964-4792 or email renee@esdrmv.com. You can also visit www.esdaerospacetraining.org. We always welcome your inquiries by phone or email.



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January 25, 2024, former Center Director Scott Hubbard and former Deputy Center Director Bill Berry visited the NRP. Dr. Eugene Tu, Ames Center Director accompanied and showed them the USGS space in building 19 and the newly built lab. They are holding rock core samples from the USGS Paleomagnetism lab! These kinds of samples helped prove continental drift, and this lab is one of the few federal labs equipped to measure ancient magnetic fields, on earth and off world!



On November 30, 2023, Ames leadership visited the newly built USGS lab building in the NRP. John Stock, Director, USGS National Innovation Center provided a tour of the facility.



Panel featuring NASA Ames Center Director Dr. Eugene Tu, UC Berkeley Chancellor Carol Christ, and SKS Partners Managing Partner Dan Kingsley listen as Nobel laureate Dr. Saul Perlmutter speaks on Oct 16, 2023.

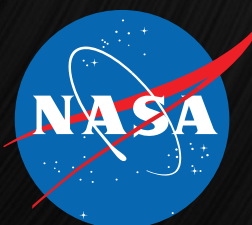


Leadership from NASA Ames Research Center, University of California Berkeley, and SKS Partners, LLC pose at Oct 16, 2023 media event announcing plans for the new Berkeley Space Center campus at NASA Research Park.

On August 23, 2023, Meighan Haider, Director of NRP hosted a visit by National Park Service (NPS) to learn about leasing efforts and partnerships opportunities, the group visited the USGS space in Bldg. 19 and Carnegie Mellon University in Bldg. 23.



On February 14, 2024 Casey Swails Deputy Associate Administrator for Business Operations visited NASA Research Park.



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