

Exploration Technology Office (ETO) Leads the Way in Leveraging Advanced Development Portfolio to Meet JSC 2.0 Technology Needs



EXPLORATION TECHNOLOGY OFFICE

Exploration Technology Office Logo Legend

Like the EISD logo, the Exploration Technology Office branding captures our commitment to exploration and customer service through color, design, and symbols. The ETO office thanks Logan Goodman for this inspirational design.

Color: The light and dark blues of the lettering represent the exchange of ideas and technologies made possible through ETO facilitated technology advancements, partnerships and infusions. This interplay of color represents advances in exploration and the synergism created when each focus area of ETO works together. The bold red of the spacecraft represents the energy and strength of our team and is a direct tie back to the EISD brand.

Design: The logo's design is modern and sleek. Its simplicity conveys our professionalism, ability to adapt, and talent for finding innovative solutions to address human spaceflight technology needs and advance commercialization.

Symbols: The O in the logo represents a celestial body in a phase change. Its waxing phase reminds us to provide progress and growth oriented products and services. The orbital path around the O reminds us that we are challenged to accelerate the mission. Finally, the triangle shaped craft represents the technology needs that will enable further exploration.

The Exploration Technology Office (ETO) was originated to do things differently. During the JSC 2.0 reorganization, the Exploration Integration and Science Directorate (EISD) was established to address the challenges of moving beyond low Earth orbit into cislunar space by accelerating our pace, stimulating commercialization, and transforming our development methods.

EISD Director Vanessa Wyche, created the Exploration Technology Office to pursue the most efficient and agile path to secure critical technologies and capabilities for new deep space missions. For the first time, all of the diverse program elements that define ETO's Advanced Development Portfolio are housed in one place.

Carlos Westhelle, ETO Deputy Manager, shares, "There is a life cycle for EISD that includes mission planning and design, programmatic integration, and execution. ETO's role is to enable the closure of technology gaps to make that execution possible." This new portfolio approach concentrates administrative insight to serve as a catalyst for expeditious achievements in technology while synergizing the strengths of each team within ETO. "This effort is significant in that it extends NASA the opportunity to leverage a cycle of transferring, sharing, and partnering with the outside community to better assure a return of key technologies that we can infuse within our own mission."

Westhelle explains, "The new architecture of ETO anchors everything we do to exploration and lets us ask 'What do we really need to be focusing on?'" We rely on our focus areas to address the different aspects of technology maturation: JSC Technology Integration, Advanced Development Portfolio Management, Technology Transfer, Partnership Development, and Class I-E efforts. We leverage each of focus areas to promote, develop, and integrate critical human space exploration expertise and extend our presence beyond ISS in a direction that is reliable, safe, efficient and affordable."

The Exploration Technology Office is JSC's catalyst for advancing our human spaceflight key technologies. Asked what ETO's efforts mean for the rest of JSC, Westhelle described the office as a service-minded organization that's passionate about exploration. "We help highlight JSC's technology work in a way that interest the commercial sector and moves marketable concepts toward patenting and publication. ETO takes on the challenge of administrating the Advanced Development Portfolio, which includes SBIR, STTR, CIF, STMD, and AES products. We develop investment strategies and put project teams in touch with potential internal and external partners to leverage ongoing development efforts." Westhelle further clarifies the role of the Exploration Technology Office, "I want ETO to be the organization the agency looks to for technology pursuits and infusion. All aspects of our office are responsible for making JSC successful and accelerating the mission as we leverage public-private partnerships. That's a big piece of what excites me."

A Resource for Innovators: Technology Transfer Team Provides Insight on New Technologies, Readies JSC for Journey to Mars



The Technology Transfer team pictured above with the new ETO logo.

The Exploration Technology Office (ETO) houses several integrated teams focused on connecting stakeholders with innovative solutions. The Technology Transfer Team specifically supplies the overall office with a clear idea of technology marketability, industry trends, and outside interest in licensing NASA technologies. The office manages both spin-offs, spin-ins and infusions.

As Technology Transfer Officer, Charlene Gilbert points out, “Tech Transfer is about discovering, documenting, and capturing new inventions then sharing them with the public. This fulfills NASA’s obligation to assure the taxpayer’s return on investments. This Tech Transfer function also enhances networking with businesses for infusion with other NASA field centers. Tech Transfer is additionally valuable to ETO’s mission due to our ability to determine whether a technology is NASA unique and connect the office with current technology trends.”

Being part of the newly founded ETO also helps the Technology Transfer team connect with innovators early in the development cycle. Gilbert adds, “As our customers, JSC NASA innovators are part of project teams that may have technologies to share. They may also need to connect with peers from outside the center to infuse their own work with new pieces of technology. Our ability to guide both paths from the start adds value to all steps of a project lifecycle and allows teams to stay on track toward accelerating JSC’s mission. Getting involved early and understanding a technologist’s needs streamlines the infusion and spin-off processes and makes everyone’s job easier.”



Gold challenge coin pictured above. Coins are awarded to innovators to honor new technologies and contributions made to JSC.



NASA astronaut Kate Rubins inspected the Bigelow Aerospace Expandable Activity Module (BEAM) attached to the International Space Station last month. The BEAM project has been selected as NASA’s 2017 Government Invention of the Year! For more information visit: [1st year of BEAM on ISS](#).

Gilbert affirms, “For our innovators, we work hard to challenge that old idea of new technology reporting as a chore, and instead show how it can be rewarding. Disclosure is everyone’s responsibility, but we want to simplify the process while making it rewarding. We help our innovators patent, publish, and license their technologies, and we are here to remove some of the hurdles and assist in meeting NASA’s duty to share intellectual property. We are service oriented, and our goal is simple: encourage Center innovation and monitor commercial innovation to accelerate the mission with smart technical decisions.”

The JSC Technology Transfer team is here to help. Get in touch with us by emailing jsc-techtran@mail.nasa.gov to share your innovations or visiting technology.nasa.gov to learn about new technologies available for licensing.

Do you know what a BLT is? It might not be what you think! It’s a tool used by Astronauts on a recent spacewalk. It is a great example of the functionalities of a Class 1-E project utilizing the Innovative Design Center (IDC) to efficiently develop test hardware. To learn more about Class 1-E projects and the services that IDC offers, you can view the JSC Web Feature about the BLT success story and learn about more options at: [NASA/JSC Features](#).

Sparking Conversations: OMICS Workshop builds toward confluence for aerospace human health and performance, sharing the latest in academic and medical industry research



Attendees from across the medical industry listened to presentations at the Gilruth Center.



Astronaut Kate Rubins addresses a speaker after a presentation. The event was interactive, with the audience providing feedback from their own experiences and asking plenty of questions.



Three attendees trade information and stories. The event gave experts a chance to connect over shared experiences by discussing cross-industry omics.

The Exploration Technology Office (ETO) facilitated an Omics Workshop at the Gilruth Center on April 11, 2017. The seminar was held by NASA JSC and the nonprofit Technology Collaboration Center (TCC) at the request of the Human Health and Performance Directorate (HH&PD).

The event covered a broad range of cross-industry omics and systems biology topic areas. Omics integrates multiple biological disciplines (e.g. genomics, transcriptomics, proteomics, epigenomics, metabolomics, and microbiomics) to focus on measurements of a wide range of biomolecules.

With Houston as the home of both human space exploration and the world's largest medical center, the timing and location of the event was perfect for fostering new collaborations.

With more than 150 attendees, this event brought together organizations from a variety of sectors to accelerate shared awareness of rapidly changing state-of-the-art technologies and research in omics. Building on a format that provided participants a chance to network and explore potential partnerships, interactive presentations and working-group discussions covered the latest in omics advances and challenges, fostering collaborative insight on specific sub-topics. Astronaut Kate Rubins, Acting Deputy Director for JSC's Human Health and Performance Directorate (HH&PD), delivered the keynote address. Participants included Baylor College of Medicine, Sandia National Laboratories, Scripps Research Institute, and Stanford Medical School, amongst others.

As ETO's Partnership Manager for the medical industry and liaison to HH&PD, Michelle Gonzales noted, "ETO Partnership Development is a service provider to the Center, offering a variety of paths for connecting subject matter experts here at JSC with their colleagues from industry, academia, other government agencies, and non-profits to address cross-cutting technology challenges. In collaboration with the TCC, we handled the logistics, provided a venue and assisted garnering external participation to ensure the event went smoothly, thus allowing our scientists and researchers time to focus on content and expectations."

As a service provider for your collaboration and partnership needs, the ETO Partnership Development Team stands ready to facilitate conversations with potential partners, guide you through the process for establishing formal partnerships, and help spin-off or spin-in technologies. All of this effort advances technology commercialization while accelerating the mission for our customers here at JSC.

If your organization would like to set up a similar workshop to collaborate with external entities, please contact the [Exploration Technology Office Partnership Gateway](#). *Help put us to work for you!*

The Tricorder Lives! JSC Small Business Innovative Research Team Partners with DNA Medical Institute to make Science Fiction Meet Reality



The rHealth sensor is pictured above. It is small enough for space travel and presents exciting possibilities for faster diagnosis. Image courtesy of TechnaBob.com.

JSC's Small Business Innovative Research (SBIR) team was pivotal in assisting the DNA Medical Institute with a recent challenge. We may have heard or recall that during the 1960s, Star Trek imagined the Tricorder, a medical device capable of performing a complete field diagnostic exercise in one scan. The tool sparked the imagination of flight surgeons and health and human performance professionals. It begged the important question for space exploration: How can we free astronauts from earth reliant diagnosis?

JSC's SBIR team partnered with the DNA Medical Institute to overcome this challenge with the development of nanoscale test strips whose fluorescent tags can be read by a laser based handheld sensor called rHealth. Proteins in the blood cause different sensors in the strip to light up, and a single drop of blood is enough for the rHealth to run a full diagnostic test. The technology will not only revolutionize current diagnosis processes on ISS but make quick diagnosis possible for long duration deep space flight.

SBIR COR oversaw the development process from start to finish, first connecting with Human Health and Performance to identify a new technology need and then working with the DNA Medical Institute to fill that gap. SBIR ensured maturation by matching \$150k in funding from outside investors during the project's Phase 2e for the Institute's research. The Institute went on to receive several million dollars in funding from private investors across the medical industry.

The technology has also been recognized with several awards, receiving \$525,000 as the Grand Prize winner of the Nokia XChallenge. Funding for the project also came from Human Health Countermeasures within JSC's Human Research Program. You can watch a video about the rHealth by [clicking here](#).

In alignment with JSC's commitment to doing things differently, SBIR is now able to discuss its investments and developments in greater detail than ever before. SBIR provides a platform to promote successful small business projects and SBIR's contributions within the space exploration community.

Interested in finding out how SBIR can infuse your project or connect you with a development partner? Check out the SBIR/STTR website for additional information: sbir.nasa.gov.

To learn more about The DNA Medicine Institute's advancements, read their information at [SBIR/DNA Success Story](#).



Patient collects a single drop of blood from finger. This small amount of blood is enough for the rHealth and its test strips to deliver a complete report.



The DNA Medical Institute development team for rHealth proudly presents their winning device.

Advancing Medical Testing Capabilities in Space: JSC SBIR Team Partners with Techshot to Bring New Tools to the International Space Station



Analytical Containment Transfer Tool (ACT²) featured above.



Full densitometer system featured above with a single laptop to drive the system. The entire system easily fits on a small tabletop.



Techshot provides continued support for its products through its Payload Operations Control Center. Techshot team featured in Q&A mode.

Exploration Technology's Small Business Innovative Research (SBIR) group is challenged with connecting small business partners with JSC scientists and engineers to produce creative solutions for technology needs. The small businesses we work with are committed to excellence in technology and innovation and their dedication and inventiveness are making deep space exploration possible.

A recent solicitation from EISD's Small Business Innovative Research (SBIR) group intrigued Techshot, a small business out of Greenville, Indiana. The partnership results proved successful when the company was recently awarded a Phase III \$9.5 million IDIQ NASA contract for its Analytical Containment Transfer Tool (ACT²). The tool was also funded by the ISS National Laboratory. The device allows astronauts aboard the ISS to transfer biological materials, including hazardous bacteria, from experiments to testing equipment. This marks an improvement on past processes, which required samples collected in orbit to be returned to earth for testing. This lengthy process often resulted in degraded samples. The new tool is disposable, cost effective, and safer than previous tools.

This was not Techshot's first invention for the ISS, however. In 2015, the company developed a flight-ready Bone Densitometer that is now used on station to study the bone density of rodents.

SBIR Specialist Michael (Doug) Goodman reports, "Because of their outstanding contributions to NASA science, we were able to nominate Techshot for a Tibbetts award which they won. The Tibbetts award is given by the Small Business Administration to companies whose innovations extend federal R&D needs. This win makes Techshot a three-time winner. SBIR is all about getting innovators and the government to grow together. We work with small businesses because they can come up with agile, new solutions.

Our capabilities place JSC and NASA in a position to capture innovative answers for the journey to Mars and advance commercialization as we assist small business partners in making their products viable for the marketplace."

Interested in infusing your project with fresh expertise? Explore the SBIR/STTR website for additional information: <https://sbir.nasa.gov>.

To read the full story on Techshot, visit their SBIR Success Story write-up at: [Analytical Containment Transfer Tool \(ACT²\)](#).