

National Aeronautics and
Space Administration



OFFICE OF THE CHIEF HEALTH AND MEDICAL OFFICER

YEAR 2023 IN REVIEW

ENSURING THE HEALTH OF EXPLORATION

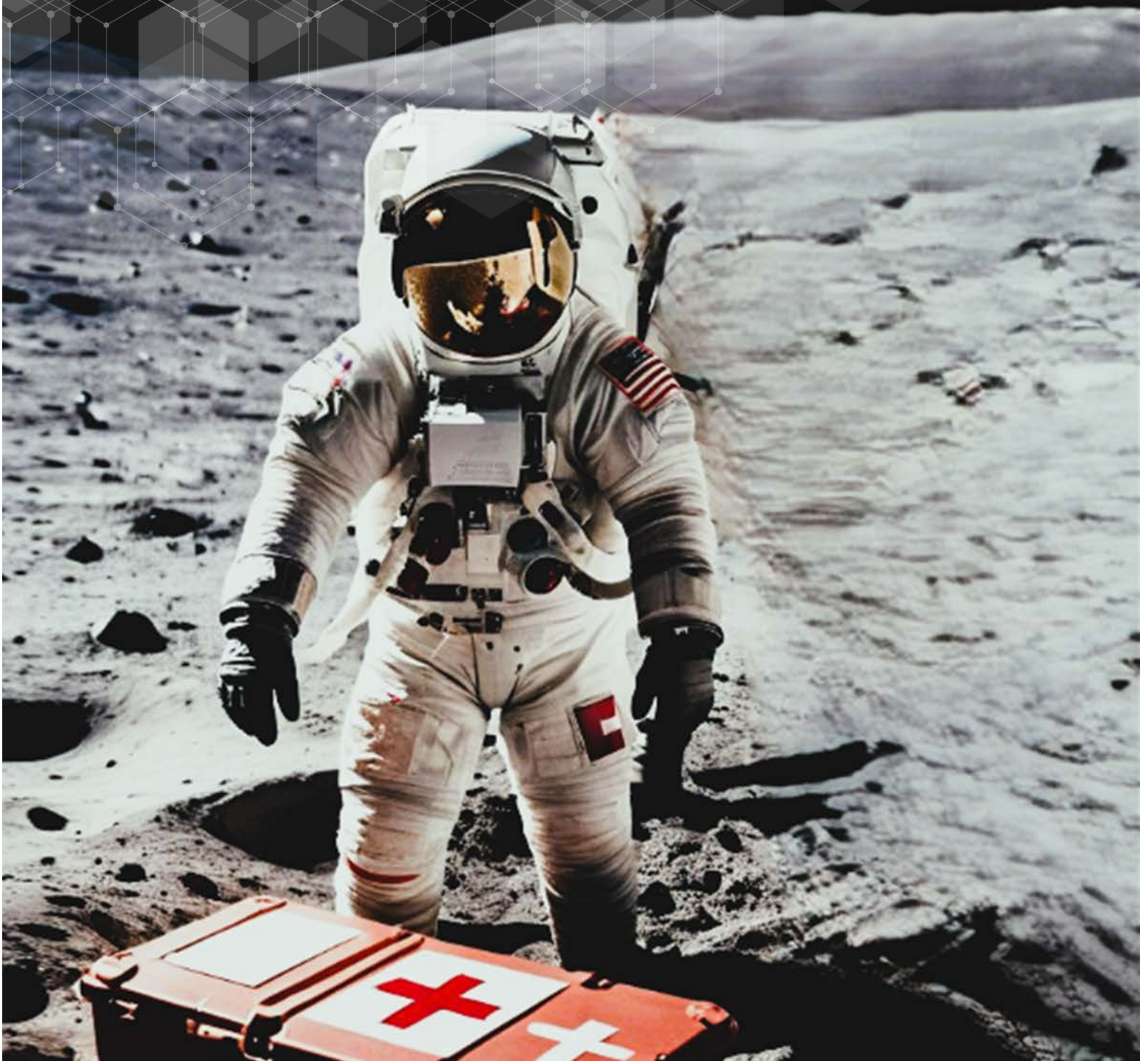


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MESSAGE FROM THE CHIEF HEALTH AND MEDICAL OFFICER



Dr. James D. "JD" Polk

DO, EdD, MS, MMM, CPE, FACOEP, FAsMA, FEWM

This small office, presided over with the utmost dedication, is not merely a sentinel standing guard over the physical well-being of those brave souls who venture into the unknown, but also a custodian of the policies that shape the very nature of our explorations. We set the strategic direction for human research and mitigations of human risk. We ensure the safety and ethics of human research and animal research. We work on the technical aspects of human system design for spacecraft and work closely with the programs and technical authorities to enable the NASA missions. We maintain the health and wellness of the most dedicated workforce to enable those missions. We work to enable our international partners, our federal partners, and our commercial partners as they embark on their own journeys into space. We share our lessons learned and are constantly striving to learn, develop, and evolve the science and medicine in a sagacious manner, to calibrate and quantify the risk of human spaceflight.

We are tasked with the oversight of medical standards that ensure the safety and efficacy of missions that stretch from the cerulean cradle of Earth to the farthest reaches of human exploration. It is a role that demands the deepest knowledge of human physiology and its adaptation or pathology in microgravity and partial gravity, as well as an understanding of how the human interacts with the engineering of the spacecraft.

In this office, one finds the confluence of science and stewardship, where every decision is made with a sense of profound responsibility to the mission of the agency, to those who work to enable that mission, and to those who dare to venture into space.

Thus, we view our task as not only that of steward and guardian of health but as an enabler of the grand human narrative of exploration—a narrative that continues to unfold with each new horizon we seek to reach. It is a role that, in its complexity and its centrality to the mission of NASA, reflects the dedication of a core group of individuals who are highly skilled and experienced in their craft.

We are a small office with a big impact.

A handwritten signature in blue ink, appearing to read "J.D. Polk, DO, EdD, MS, MMM, CPE, FACOEP, FAsMA, FEWM".



OVERVIEW AND STRUCTURE

Earth observation taken aboard the International Space Station.

The Office of the Chief Health and Medical Officer (OCHMO) is the principal office responsible for the administration of health and medical policy and oversight of related activities. We provide guidance through effective and efficient policies, procedural requirements, technical standards, and programs to ensure the safety, health, and productivity of humans and animals in the global spaceflight and NASA community.

MISSION STATEMENT

Providing for health and wellness on Earth and in space, discovering new insights into medicine, educating the next generation, and innovating for the benefit of space exploration and humanity.

VISION STATEMENT

To expand the frontiers of health and wellness on Earth and in space.

CORE VALUES

NASA is committed to maintaining an environment of trust, built upon honesty, ethical behavior, respect, and candor.

OCHMO actively seeks to ensure the health and wellness of those working toward the exploration of air and space.

NASA is committed to a culture of diversity, inclusion, and equity, where all employees feel welcome, respected, and engaged.



NASA's constant attention to safety is the cornerstone upon which we build mission success.

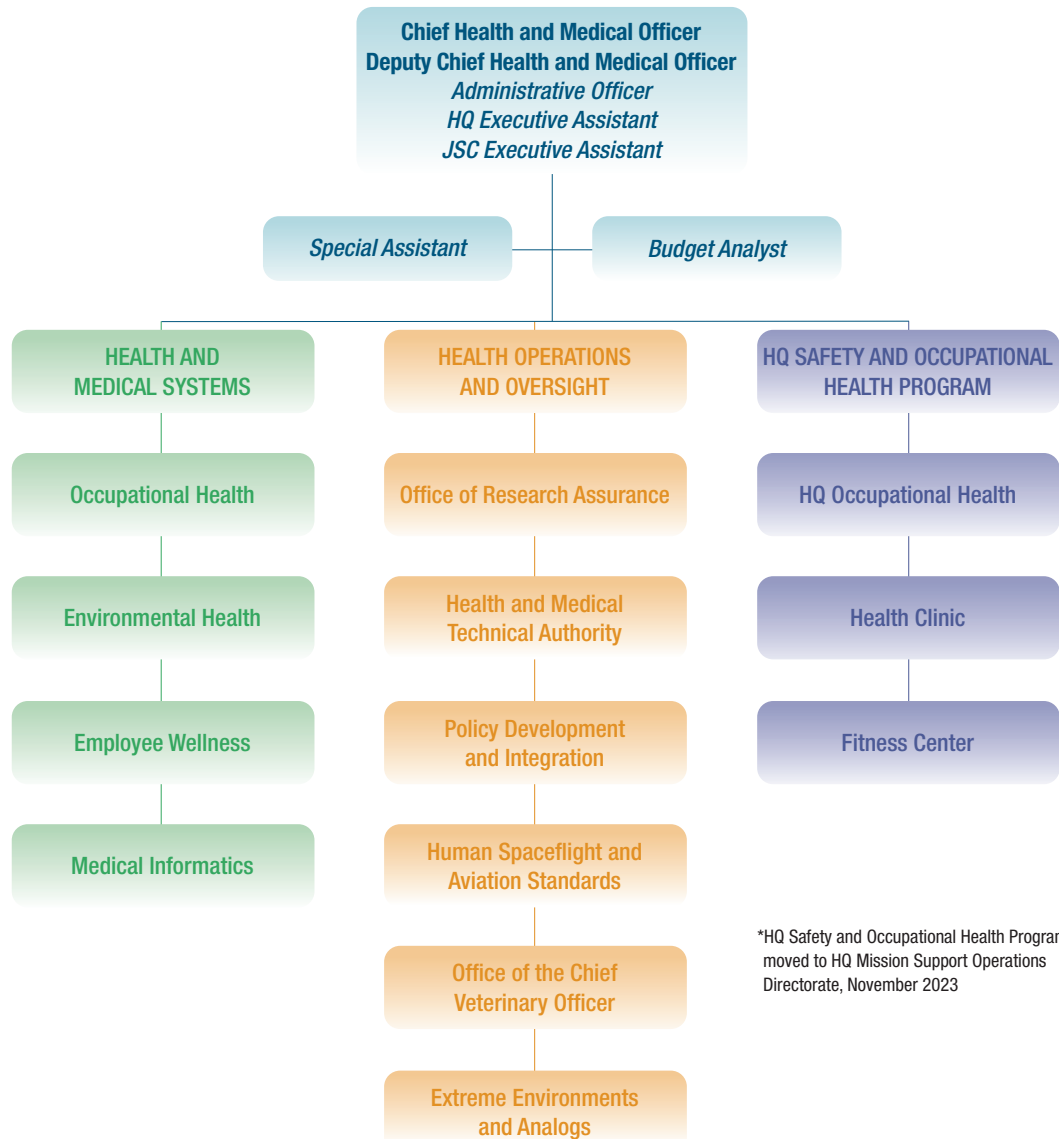
To achieve the highest standards in engineering, research, operations, and management in support of mission success, NASA is committed to nurturing an organizational culture in which individuals make full use of their time, talent, and opportunities to pursue excellence in conducting all agency efforts.

OCHMO fosters curiosity to enable personal growth, encourage innovation, and enable discovery.

NASA's most powerful asset for achieving mission success is a multi-disciplinary team of diverse, talented people across all NASA centers.

Organization Structure

The OCHMO is composed of three divisions: (1) Health and Medical Systems, (2) Health Operations and Oversight, and (3) Headquarters Safety and Occupational Health. Each division plays a key role in promoting, developing, maintaining, and advocating the best health and medical operations, practices, and standards for NASA and oversees and implements a variety of projects, programs, and initiatives at NASA Headquarters, Centers, and facilities around the country.



*HQ Safety and Occupational Health Program moved to HQ Mission Support Operations Directorate, November 2023

Executive Leadership and Administrative Team

James “JD” Polk,
Chief Health and Medical Officer

Vincent Michaud,
Deputy Chief Health and Medical Officer

Jade Spurgeon,
Director, Health and Medical Systems

Mark Weyland,
Director, Health Operations and Oversight

Meredith Hawkins,
Administrative Officer

Samantha Harvey,
Executive Assistant, NASA Headquarters

Sara Frahlman,
Executive Assistant, Johnson Space Center



NASA's Chief Health and Medical Officer, Dr. J.D. Polk, speaking at the 2023 HMTA Summit.



OCHMO staff (left to right: Azhar Rafiq, Dr. Jade Spurgeon, Bart Geyer, Dr. J.D. Polk, and Dr. Vince Michaud) at the 2023 OH Operational Update meeting at LaRC.



Dr. J.D. Polk and Mark Weyland at the 2023 OH Operational Update meeting at LaRC.

Team Leads

Health and Medical Systems

Angel Plaza,
*Senior Environmental Health Officer,
Environmental Health*

Janine Scoville,
Program Manager, Employee Wellness

Azhar Rafiq,
Director, Medical Informatics

NASA HQ Safety and Occupational Health Programs

(These functions were reorganized under MSD at the end of CY23)

Christopher Warren,
Program Manager

Policy Development and Integration

Gwyn Smith,
Manager, Policy Development and Integration

Health and Medical Technical Authority (HMTA)

Neal Zapp,
*Manager, HMTA, and Chief Health and
Performance Officer, Space Operations Mission
Directorate (SOMD) and Exploration Systems
Development Mission Directorate (ESDMD)*

Debra Berdich,
*Deputy Manager, HTMA, and Deputy Chief Health
& Performance Officer, SOMD and ESDMD*

Office of Research Assurance (OORA)

Marisa Covington,
*Director, OORA, and Chair, NASA Institutional
Review Board*

Victor Schneider,
Research Liaison

Human Spaceflight and Aviation Standards

Dave Francisco,
*Manager, NASA Technical Fellow for Health,
Medical, and Performance Spaceflight Standards*

Office of the Chief Veterinary Officer

Chad Foster,
Chief Veterinary Officer

Mary Lou James,
Flight IACUC Chair

Laura Lewis,
Management Officer

Extreme Environment and Analogs

Marc Shepanek,
Program Lead



OCHMO team stationed at JSC, from left to right: Dave Francisco, Angel Plaza, Debbie Berdich, Dr. Marisa Covington, Mark Weyland, and Dr. Neal Zapp.

Support Staff



NASA's HMTA support teams at the 2023 HMTA Summit at JSC.

Health and Medical Systems

Hanna Bogner
Matty Budesa
Regina Chisholm
Nancy Eckhardt
Olga Emgushov
Erin Jensen
Bart Geyer
Jamie Gurney
Layzamarie Irizarry-Colon
Robert McIntosh
Michael McPherson
William Wilson

Health and Medical Technical Authority

Courtney Barringer
Yamil Garcia
Travis Houser
Tanya Paine
Dave Rubin
Michelle Urbina

Office of the Chief Veterinary Officer

Elaine Kim
Julia Kissling

NASA Headquarters Health Clinic

Andrea Fore, MD
Monica Edwards
Lolita Bautista
Carla Randolph



OCHMO's Occupational Health (OH) Program review team at Armstrong Flight Research Center (AFRC) from left to right: Steven Black, Bart Geyer, Hanna Bogner, Jamie Gurney, Michael McPherson, Abraham Chupp, Dr. Olga Emgushov, Angel Plaza, and Miriam Rodon.

Support Staff *(continued)*

Office of Research Assurance

Sara Asgar
Arturo Garza
Jennifer Ensley Gorshe
Jennie Green
Jessica Kisenwether
Cyndi Roman

Policy Development and Integration

Lesley Lee

Headquarters Safety and Occupational Health Program

Aidan Christopher
Lisa Lohr

Human Space Flight and Aviation Standards

Sarah Childress
Kristin Coffey
Doug Ebert
Emma Hwang
Kim Lowe
Imene Mechkene
Harrison Otto

NASA Headquarters Fitness Center

Romaan Khan
Megan Reilly
Marceus Venable



OCHMO staff and Occupational Health Team at 2023 Operational Update meeting at Langley Research Center.



OCHMO's Standards team (left to right): Tara Williams, Emma Hwang, Kim Lowe, Imene Mechkene, Carisa Champion, Sarah Childress, Chance Melton, Kristin Coffey, Dave Francisco, and Joanne Kaouk.



NASA's Institutional Review Board (IRB) team (left to right): Roxanne (a Public Responsibility in Medicine and Research [PRIMR] attendee), Jennifer Ensley Gorshe, Sara Asgar, Cyndi Roman, Arturo Garza, and Jennie Green at the 2023 PRIMR annual conference.



Internship Spotlight



Amanda Hogan,
Human Spaceflight and Aviation
Standards Intern, Fall 2023

Ms. Hogan, a senior at Rice University, is pursuing a bachelor of science degree in biosciences and data science. She is passionate and interested in computational biology, including functional genomics and proteomics, and the intersection of biology and space. She worked with OCHMO's Standards Team on technical briefs and documentation for NASA Standard 3001, guiding operations and design of human-rated systems. She looks forward to returning to Rice in the fall to continue pursuing her master's in space studies.



Chance Melton,
Human Spaceflight and Aviation
Standards Intern, Summer 2023

Mr. Melton, a senior at Texas A&M University (TAMU), is pursuing a degree in neuroscience. He conducted Post-Traumatic Stress Disorder (PTSD) research on rat models at TAMU and worked with the Standards Team to supplement his research skills and knowledge. During his internship, Mr. Melton created the newly published Crew Selection and Recertification technical brief, drafted a trace from the Medical Evaluation Documents (MED) to NASA Standard 3001, and worked on a future plan for crew survivability. Mr. Melton plans to enroll in medical school in the fall of 2024.

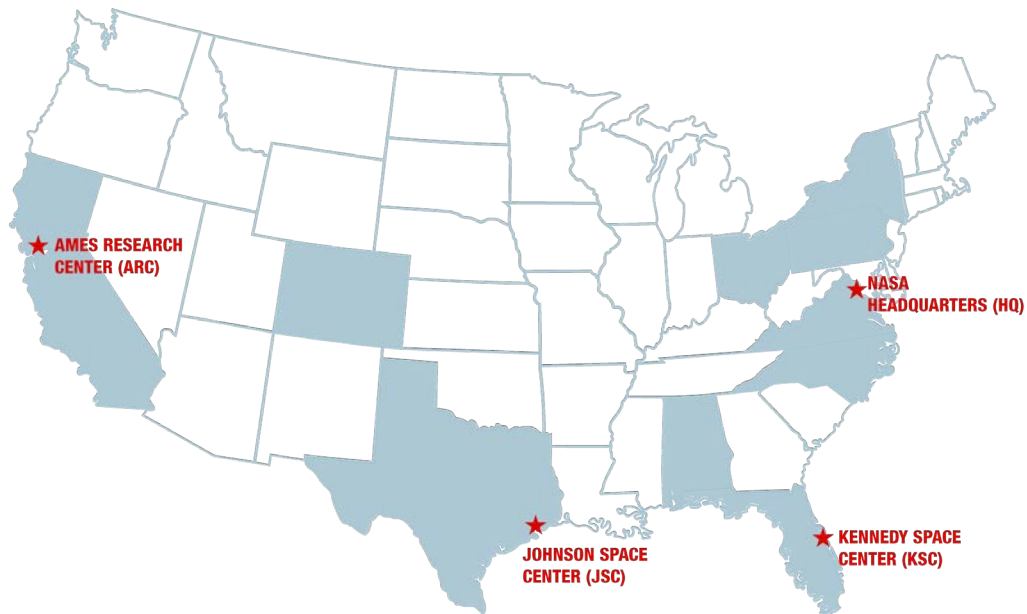


Dr. Kristen Peagler,
Office of the Chief Veterinary
Office Intern, Summer 2023

Dr. Peagler is a second-year resident in a laboratory animals medicine residency at Washington State University seeking board certification by the American College of Laboratory Animal Medicine. She previously completed an externship with NASA while in veterinary school.

During her internship, Dr. Peagler gained significant exposure to all aspects of NASA's animal operations and activities. Amongst a long list of accomplishments, she participated in daily animal care facility operations; drafted an animal health-monitoring program for rodents on the International Space Station (ISS); served as task leader for a working group developing standardized acclimation procedures for rodent research; participated in wildlife field work and protocol review with the NASA Environmental and Medical Contract (NEMCON) at Kennedy Space Center; and accompanied the Chief Veterinary Officer to meetings with leaders and stakeholders in Space Biology, the ISS National Laboratory (ISSNL), the ISS Payload Program Office (OZ), the Research Mission Success Tiger Team, and OCHMO. Dr. Peagler plans to pursue a career at NASA following the completion of her training program in the summer of 2024.

Work Locations



Disciplines, Certifications, and Specialties

The OCHMO workforce is composed of multiple disciplines and talented staff who have an array of unique and diverse educational training, hold highly skilled certifications and designations, and possess an assortment of expertise.

Below is a highlight of OCHMO educational background and work focus areas.



MEDICAL DEGREES AND BOARD CERTIFICATIONS

Adult Education, Aerospace Medicine, Doctor of Medicine, Endocrinology, Emergency Medicine, Internal Medicine, Neurobiology, Occupational Medicine, Osteopathic Medicine, Pediatrics, Preventative Medicine, Psychiatry, Veterinary Medicine



BACHELOR'S AND MASTER'S DEGREES

Applied Physics, Biology, Biomedical Engineering, Biomedical Ethics, Business Management, Chemistry, Education, Electrical Engineering, Environmental Health, Health Physics, Kinesiology, Kinesiology/Cardiac Rehabilitation, Mathematics, Medical Management, Military Art and Science, Nuclear Engineering, Physics, Public Health, Radiological Health Engineering, Space Studies



ADVANCED/ DOCTORATE DEGREES

Aviation and Space, Health Physics, Particle Physics, Public Health, Toxicology



PROFESSIONAL CERTIFICATIONS AND DESIGNATIONS

Aerospace Medical Association (AsMA) Fellow, American College of Laboratory Animal Medicine (ACLAM) Diplomate, American College of Occupational and Environmental Medicine (ACOEM) Fellow, American College of Osteopathic Emergency Physicians (ACOEP) Fellow, Certified Chief Flight Surgeons, Certified Industrial Hygienist (CIH), Certified IRB Professionals (CIP), Certified Safety Professional (CSP), Extreme and Wilderness Medicine Fellow, Federal Aviation Administration (FAA) Medical Examiner

NASA Awards

The NASA Agency Honor Awards (AHAs) are the most prestigious honor awards given to staff. The awards are for individuals and groups who made outstanding contributions to the agency’s mission. OCHMO received several AHAs in various categories highlighting the work efforts of both its federal and contract staff.



Casey Swails, NASA’s Deputy Associate Administrator presents the Early Career Achievement Award to Dr. Jade Spurgeon, Director of Health and Medical Systems.



Dr. Jade Spurgeon presents the Exceptional Public Achievement Award to Dr. Olga Emgushov, Occupational Health Physician.



Dr. Jade Spurgeon presents the Group Achievement Award to EAP Providers Terry Sterry (MSFC), Patricia Bell (KSC), Jacqueline Reese (JSC), and Susan Wilcox (GRC).



Casey Swails, NASA’s Deputy Associate Administrator, presents the Exceptional Public Service Award to Charles “Chuck” Doarn, Special Assistant.

Collaborations

OCHMO routinely works and collaborates with a number of external federal, independent, private, and educational institutions on health, medical, and research issues. The collaborations help NASA to achieve the highest standards in engineering, research, operations, and management in support of spaceflight missions.

FEDERAL AND MILITARY SPACE AGENCIES

Air Force Medical Service (AFMS)
 Department of Energy (DOE)
 Department of Health and Human Services (DHHS)
 Department of the U.S. Air Force (DAF)
 Environmental Protection Agency (EPA)
 Federal Aviation Administration (FAA)
 Food and Drug Administration (FDA)
 National Institutes of Health (NIH)
 National Transportation Safety Board (NTSB)
 North Atlantic Treaty Organization Special Operations Forces Command (NATO SOFCOM)
 U.S. Department of Agriculture (USDA)
 U.S. Department of Defense (DOD)
 U.S. Department of Labor (DOL)
 U. S. Department of Veterans Affairs (VA)
 United States Space Command
 United States Space Force (USSF)

INDEPENDENT ORGANIZATIONS

United Nations (UN)
 World Health Organization (WHO)

PRIVATE ORGANIZATIONS AND EDUCATIONAL INSTITUTIONS

Aerospace Medical Association (AsMA)
 American Board of Preventive Medicine (ABPM)
 American College of Occupational and Environmental Medicine (ACOEM)
 National Academy of Sciences (NAS)
 National Sanitation Foundation (NSF)
 Nuclear Regulatory Commission (NRC)
 SAE International (SAE)
 The Institute of Electrical and Electronics Engineers (IEEE)
 The University of Texas Medical Branch (UTMB)

INTERNATIONAL ORGANIZATIONS AND INSTITUTIONS

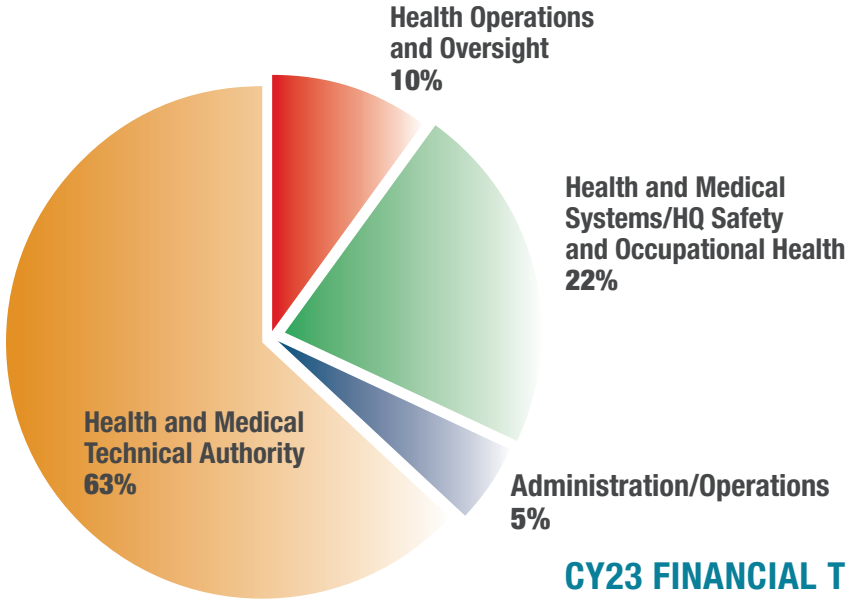
Australian Space Agency (ASA)
 Canadian Space Agency (CSA)
 European Space Agency (ESA)
 French Space Agency (CNES)
 Indian Space Research Organisation (ISRO)
 Japan Aerospace Exploration Agency (JAXA)
 Russian Space Agency (RSA)
 Scientific Committee on Antarctic Research (SCAR)
 University of Strathclyde in Glasgow, Scotland



OCHMO hosted the 2023 Artemis Multilateral Medical Policy Board in Glasgow, Scotland. Attendees included NASA staff and international partners. From left to right: Front row—Sara Frahman (OCHMO), Dr. J.D. Polk (OCHMO), Dr. Masatsugu “Masa” Higuchi (JAXA), Dr. Sharmi Watkins (NASA), Dr. Raffi Kuyumjian (CSA), Dr. Satoshi Hayamizu (JAXA), and Mari “Kyoda” Kigoshi (JAXA). Back row—Dr. Sergi Vaquer Araujo (ESA), Dr. Neal Zapp (OCHMO), and Dr. Terrance “Terry” Taddeo (NASA).

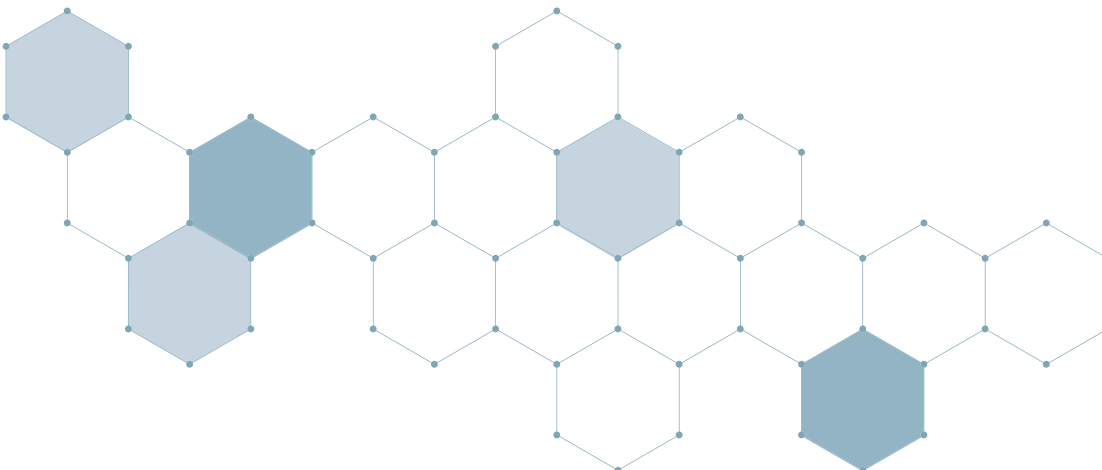
Financial Snapshot

The OCHMO’s operations and expenditures budget for CY 2023 totaled \$19.9 million. Funds were used to support a variety of programs, projects, and special initiatives and mission support activities.

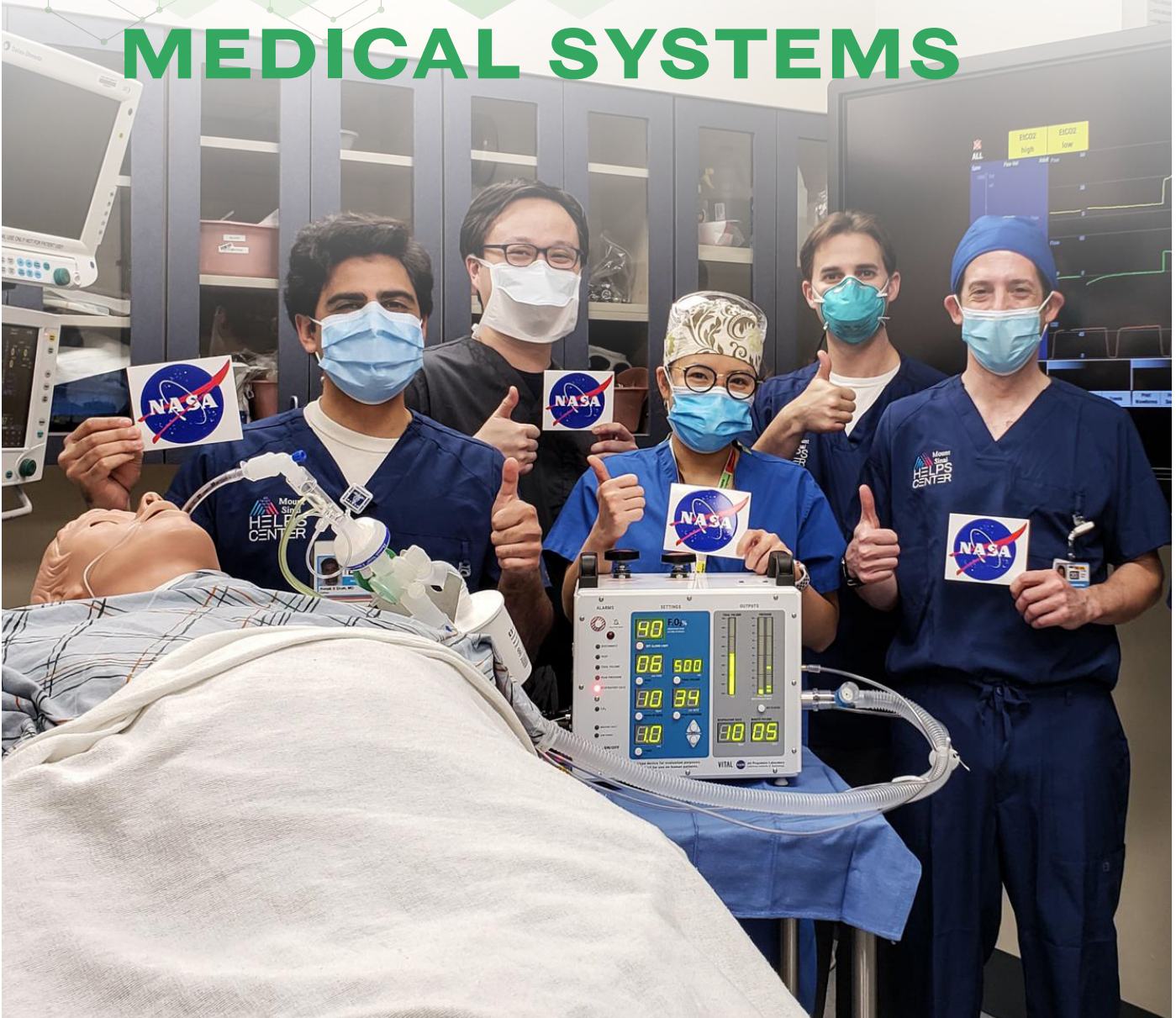


CY23 FINANCIAL TOTAL \$19.9M

Work Areas	Sum of CY2023 Budget
Administration/ Operations	\$961,052
Health and Medical Technical Authority	\$12,580,127
Health Operations and Oversight	\$1,900,372
Health and Medical Systems/HQ Safety and Occupational Health	\$4,490,449
Grand Total	\$19,932,000



HEALTH AND MEDICAL SYSTEMS



NASA engineers develop a ventilator for COVID-19 patients.



<https://www.nasa.gov/ochmo/health-and-medical-systems/>



“I am privileged to lead an amazing group of talented and dedicated professionals! Everyone supporting the Agency’s Occupational Health disciplines helps to make NASA a safe and healthy place where our employees can thrive and accomplish incredible things.”

Jade Spurgeon, MD, MPH
Director, Health and Medical Systems

Priorities and Initiatives

- ✓ Health and Medical Systems provides oversight of occupational health operations for NASA employees in all environments, including spaceflight and ground activities, to optimize employee performance and well-being.
- ✓ Health and Medical Systems ensures compliance with all federal regulations and evidence-based, industry best practices to support and maintain health standards for the NASA workforce.
- ✓ Health and Medical Systems directs the Agency-wide Occupational Health Program (OHP), which is composed of the following disciplines: Occupational Medicine, Environmental Health, Employee Wellness, and Health Information Technology.
- ✓ Occupational Medicine ensures early identification of occupational illnesses and prompt care for occupational injuries, allowing return to work and full functional recovery. The OCHMO’s focus is on preventing adverse health events through promotion of the health and wellness of every NASA employee. A healthier workforce is more productive and better able to meet the mission and vision goals for NASA as we look to an exciting future.
- ✓ Environmental Health (EH) oversees all NASA Centers’ Environmental Health programs, including Industrial Hygiene, Health Physics, Lasers, Radiation Safety, and Food Safety, to ensure hazard surveillance and mitigation.
- ✓ Employee Wellness oversees all Centers’ Employee Health programs, including Occupational Medicine, Health Promotion, Wellness, Fitness, Employee Assistance Program (EAP), and Federal Workers’ Compensation, to ensure the health and well-being of NASA employees.
- ✓ Health Information Technology (Health IT) oversees all Centers’ Health Information Technology (IT), including the Agency’s Electronic Health Records System (EHRS), employee medical records, industrial hygiene records, and systems security.

Accomplishments

Occupational Health Program

In 2023, OHP staff conducted onsite reviews of the Occupational Health (OH) programs of NASA Headquarters; three Centers—Kennedy, Johnson, and Armstrong; and three Facilities—White Sands, Wallops, and Michoud. The onsite reviews consisted of interviews with employees, walk-throughs of selected areas and processes, and reviews of objective evidence such as documentation and records related to Occupational Medicine, Industrial Hygiene, Health Physics, Wellness, Health Promotion and Fitness, Food Safety, Health Information Technology, and the Employee Assistance Program to ensure that established requirements and recommended best practices were used to implement and comply with NASA Occupational Health Program Procedures (NASA Procedural Requirements [NPR] 1800.1E).

The OHP team hosted its Annual Occupational Health Operational Update meeting in June 2023 at Langley Research Center. More than 230 occupational health and safety professionals attended the meeting, representing all NASA Centers and nine professional disciplines. Up to 12 hours of

continuing education credits were awarded to attendees to ensure professional development and maintenance of industry certifications.

Also, OCHMO's OHP and Policy teams reviewed and revised NASA's Occupational Health Policy, incorporating up-to-date best practices and industry standards with key existing requirements into NASA Policy Directive (NPD) 1800.2E, NASA Occupational Health Program, and NPR 1800.1E. OHP staff adjudicated over 1,000 comments, coordinated feedback across all Centers, and worked with the Policy team to ensure compliance with NASA directive procedural requirements. Once the directive was published in the NASA Online Directives Information System (NODIS), OHP staff continued to provide support to OH professionals as they became familiar with and implemented the updated guidance. This new revision has resulted in a better understanding of and increased adherence to the agency's OHP requirements.

Occupational Medicine

The Occupational Medicine team continued its oversight of all onsite NASA medical clinics and staff to ensure adherence to federal and NASA regulations, industry best practices, and evidence-based protocols. In 2023, nearly 27,000 clinical visits and more than 300 different classes of medical certifications and clearances were accomplished across the agency.



NASA astronaut Karen Nyberg conducts an ocular health exam on herself in the Destiny laboratory of the Earth-orbiting International Space Station (ISS).



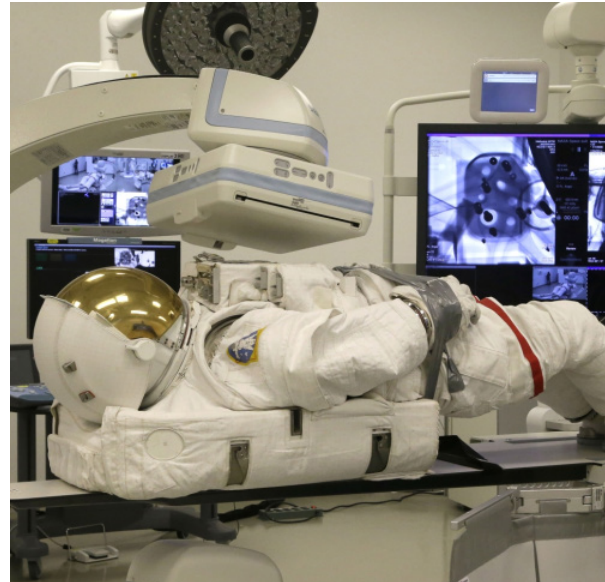
ENVIRONMENTAL HEALTH

Angel Plaza

Senior Environmental Health Officer

The EH team continued its comprehensive approach to working with Centers by chairing and/or co-chairing 13 internal and external working groups. EH staff actively engaged in collaborative partnerships to facilitate the sharing of best practices; aid in the standardization of practices; establish consistent protocols; and utilize evidence-based guidelines to address challenges and concerns. This effort empowered individual Centers to uphold exemplary and quality standards while enhancing operational efficiency, streamlining workflows, and minimizing unnecessary redundancies while aligning with regulatory requirements and industry standards.

Most notably, the Laser Safety Review Board, chaired by EH's Senior Environmental Health Officer, reviewed over 30 outdoor laser projects and missions that originated, partnered, and/or collaborated with NASA. Laser reviews are instrumental in maintaining the safety of the NASA workplace and employees, as well as members of the general public. By developing strategies to protect against potential serious health effects of unmitigated laser exposure, the EH team is helping to pave the way for NASA to safely use lasers for missions involving aircraft, spacecraft, and enhanced communications. By the end of 2023, the Laser Safety Review Board had also evaluated the Tropospheric Ozone Lidar System Outdoor Laser and Stratospheric Ozone (TROPOZ) Outdoor Laser operations, High Energy Laser with Integrated Optical-dazzler and Surveillance (HELIOS) Integrated Development Test, and Europa Lander Intelligent Landing System projects.



NASA and JSC Houston work on space suit

Also, the EH team created an agency-wide digital food safety tool called the Food Inspection Survey to aid Centers' food safety professionals as they performed inspections and risk assessments. The use of the survey validated the effectiveness of food safety measures in accordance with industry best practices to minimize employees' risks of exposure to foodborne diseases at the 80+ food establishments throughout the agency.



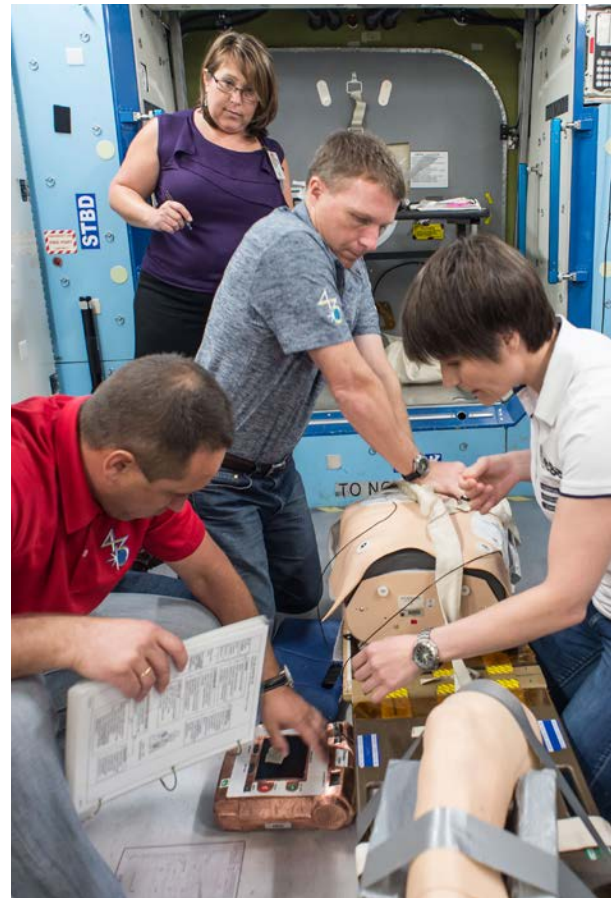
EMPLOYEE WELLNESS

Janine Scoville

Program Manager, Employee Wellness

The Employee Wellness team created NASA's Mission: HEALTH initiative, a comprehensive approach to employee wellness that is aligned with the National Institute for Occupational Safety and Health's (NIOSH) "Total Worker Health" program. Under this initiative, the team spearheaded virtual health promotion efforts for more than 1,600 events that reached the agency's entire workforce. New virtual Employee Assistance Panels and educational series were introduced covering the topics of caregiver education, brain health, suicide awareness and prevention, and understanding Alzheimer's disease. Lastly, Employee Wellness staff promoted NASA Headquarters EAP presentations across all Centers, which resulted in notable increases in participation, from 50 to over 300 attendees per session.

NASA's EAP professionals delivered personalized one-on-one support across multiple sessions to over 30,000 employees and their families; conducted thousands of presentations, workshops, and group support sessions; provided more than 20 grief support sessions to coworkers affected by employee deaths; successfully intervened in several suicidal ideation cases; helped de-escalate multiple urgent aggressive and assault-related cases; and met with Center Directors to proactively share concerns.



Soyuz crewmembers practicing CPR during Mega Code training.



HEALTH INFORMATION TECHNOLOGY

Azhar Rafiq

Director of Medical Informatics

In 2023, the Health IT team performed extensive work to manage the updating and transitioning of health protocols and records into NASA's Electronic Health Records System (EHRS). The team updated 10,000 periodic exam activities protocols in EHRS database to ensure that Similar Exposure Groups (SEGs) aligned with recent updates made in NASA NPR 1800.1E, which covered appropriate care for employees during exam activities. Health IT staff also conducted extensive hands-on training and collaborated with Center employees to implement necessary changes.

In addition, the Health IT team migrated all of KSC's medical records into the EHRS. The team provided comprehensive mentoring to clinic staff to assure that clinical workflow practices and records management processes would be integrated with EHRS's new digital interface. The team successfully transferred 40 years of legacy clinical exam data while achieving zero errors in data quality.

Lastly, Health IT staff guided all Agency clinic efforts to digitize paper-based medical records and import the data into the EHRS. This action resulted in quality assessments of the records, accuracy in classifying the documents within each employee's record, digital conversion of legacy documents, and adherence to the National Archives and Records Administration (NARA) requirements.



NASA medical staff testing space-based surgical functions in a microgravity environment.

Collaborations and Work Groups

Key collaborations and work groups for the OHP included the following:

The EH team joined forces with NASA's Office of Safety and Mission Assurance (OSMA) and Environmental Management Division (EMD) to assess new technologies and emerging chemicals that support total worker health and mission accomplishments, working with the NRC on policy and risk assessments for spacebound devices containing radioactive sources, and partnering with the Office of Management and Budget (OMB) on policy for UV germicidal technologies.

The Employee Wellness team partnered with DOL to administer NASA's Federal Workers' Compensation Program to educate and assist employees about rights and benefits, which caused NASA to have one of the lowest charge-back costs of any federal agency in 2023.

The Health IT team collaborated with the Office of the Chief Information Officer (OCIO) to ensure that security for EHRS met the highest standards of cybersecurity compliance as demonstrated by successful completion of OCIO's 2023 annual audit.

HQ SAFETY AND OCCUPATIONAL HEALTH



Fitness class at NASA Headquarters gym.



<https://nasa.sharepoint.com/sites/hq-soh>






“I am grateful for a team that makes a meaningful difference in the safety, health, and well-being of our NASA co-workers. There is no better legacy knowing that together we made our part of the world a little better place.”

Christopher Warren

Program Manager, Headquarters Safety and Occupational Health

Priorities and Initiatives

-  Manages Safety and Occupational Health (SOH) programs at NASA Headquarters, including occupational medicine, fitness, wellness, EAP, and occupational health and safety.
-  Prevents occupational injuries and illnesses by identifying hazards accurately and in a timely fashion, facilitating resourceful and relevant hazard abatement, and providing reliable and responsive communication.
-  Ensures NASA Headquarters compliance with federal occupational safety and health requirements.



Marceus Venable leads Deskfit seminar at NASA Headquarters.

Accomplishments

Employee Health and Safety

For much of 2023, the SOH team focused on increasing and maintaining workplace safety and enhancing employee health and wellness.

The SOH team increased safety and health inspections of offices to identify hazards, recommend solutions, and correct concerns on the spot. Amongst 21 Headquarters organizations, 101 hazards were identified, and new Collateral Duty Safety Representatives (CDSR) were appointed to assist with walk-throughs. In addition, for the new Earth Information Center, the SOH team reviewed and approved safety plans and performed ad hoc and weekly safety inspections to ensure that designs met safety requirements during the development phase.

The SOH team also conducted 28 Indoor Air Quality (IAQ) assessments, a significant increase over the previous year, remaining compliant with federal IAQ standards.

The EAP continued its contract with AllOne Health to provide employees with access to work-life resources, counseling support, management

Lunch-and-Learn Webinars and Program

The SOH team offered over 58 lunch-and-learn webinars in conjunction with the Safety, Fitness Center, Health Unit, and EAP Program as part of a multi-disciplinary effort to address a variety of health and wellness concerns. Agency-wide attendance increased 280 percent over last year's.

New Employee Trainings and Orientations

The SOH team conducted 10 new employee training sessions, including two sessions for interns, and provided safety orientations to 75 employees, an increase from previous years' attendance.

consultations, emergency and legal/financial services, and medical advocacy.

The ergonomics program effectively minimized risks of musculoskeletal injuries to employees (onsite and remote) through evaluations and alterations to furniture, equipment, and training to mitigate occupational ergonomic hazards. These actions, along with ergonomic training, helped to reduce ergonomic-related mishaps.

The Health Unit focused on expanding its services beyond those needed for mission-critical activities. The Health Unit Clinical Program consisted of fitness and travel clearances, annual physical exams, audiograms and medical surveillance, pre-employment physicals, and labs.

Health Clinic staff also worked with the Fitness Center and EAP to offer 57 wellness programs to address employee health concerns and encourage the adoption of healthy habits. This multi-disciplinary partnership increased the Health Unit's emphasis on overall wellness.



NASA Headquarters

HEALTH OPERATIONS AND OVERSIGHT



Artemis II Commander Reid Wiseman leads his crew down a ramp and into the well deck of the U.S.S. San Diego for an Orion spacecraft mission.



“It is a privilege to serve with such an amazing group of people within the Health Operations and Oversight Division. They never cease to amaze me with their work ethic, creativity and leadership across so many different subject matter expert disciplines as well as a diversity of programs and projects.”

Mark Weyland

*Director, Health Operations
and Oversight*

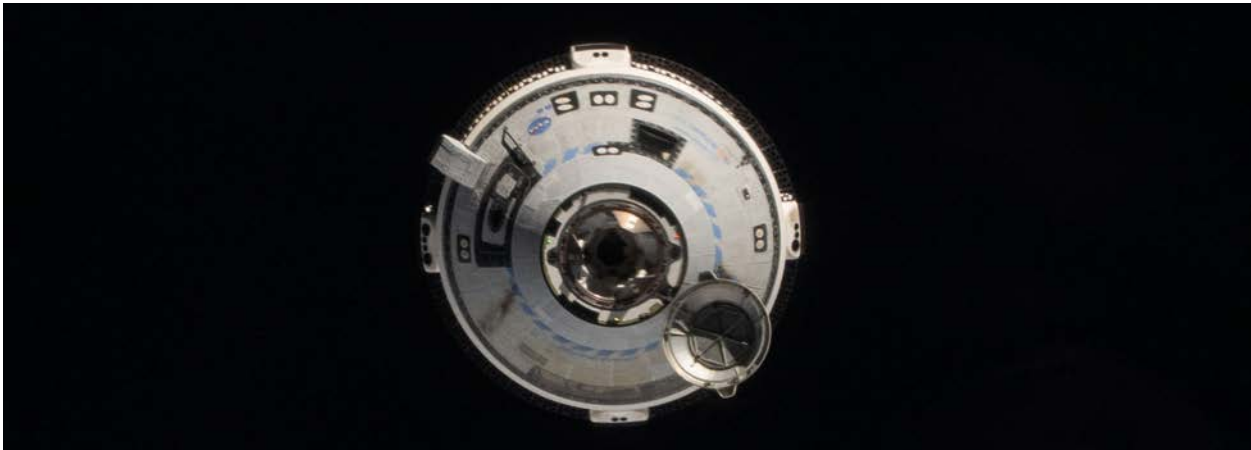
Priorities and Initiatives

- ✓ Provides oversight of the formulation and implementation of health and medical policy, including standards related to the care of spaceflight and aviation crews and the regulatory use of human and animal subjects in NASA-sponsored research; the implementation of NASA’s HMTA; the study of extreme environments; and the translation of research findings into operations.
- ✓ Health Operations and Oversight is composed of Policy Development and Integration, the Health and Medical Technical Authority, Human Spaceflight and Aviation Standards, the Office of Research Assurance, the Chief Veterinary Officer, and Extreme Environments and Analogs.

A NASA astronaut completes an installation outside the International Space Station.



POLICY DEVELOPMENT AND INTEGRATION



The Starliner spacecraft on NASA's Boeing Crew Flight Test approaches the International Space Station.





“Over 25 years at JSC set the foundation to spend that last 6 years leading the development of medical policy for the Agency. Medical policy is the backbone of OCHMO’s ability to ensure the health and safety of current and former astronauts, NASA employees, and anyone visiting NASA centers as well as to conduct ethical human and animal research. I am extremely appreciative of those who have contributed to the development and implementation of policy that allows OCHMO and NASA to be world leaders in human spaceflight.”

Gwyn E. Smith

Manager, Policy Development and Integration

Priorities and Initiatives

-  Ensures consistency, accountability, and excellence in the provision and oversight of OCHMO’s responsibilities in aerospace, occupational, and veterinary medicine; flight crew and workforce health and safety; in the ethical conduct of human and animal research; and as the Agency Health and Medical Technical Authority.
-  Guides the development and implementation of policies that communicate specific mandatory instructions and requirements, define purpose, grant authority, and assign key responsibilities and tasks to NASA employees, organizations, and programs.



<https://www.nasa.gov/ochmo/health-operations-and-oversight/ochmo-policy1/>

Accomplishments

NASA Occupational Health Program and Quality Assurance of Medical Care

OCHMO Policy and Occupational Health teams published revisions to NASA Policy Directive (NPD) 1800.2 and NASA Procedural Requirements (NPR) 1800.1 in the spring of 2023. These policies and procedural requirements ensure a safe and effective Agency-wide Occupational Health Program. This multi-year effort brought the policy current with up-to-date best practices and industry standards.

Also, in response to the burgeoning need for space medicine expertise in the commercial spaceflight sector, OCHMO provided guidance on proper qualifications for NASA flight surgeons through a new policy, Appropriate Credentials for NASA Flight Surgeons (NID 1850.141).

Private Astronauts and NASA Suborbital Research Specialists

The policy and standards teams worked together to draft revisions to policy and standards to move detailed medical requirements imposed on private astronauts and NASA suborbital research specialists from the current policy to standards documentation. The policy team also continues to address issues with terminology that have delayed the publication of revisions. The NID, published several years ago, continues to be in effect until new policy and standards are published.

Astronaut Mortality

After 60 years of spaceflight, OCHMO has embarked on an effort to establish an Agency policy addressing astronaut mortality. For several years, OCHMO has been working with stakeholders, both internal and external to NASA, to understand each organization's role and develop policy that will guide the development of detailed procedures. This policy is in final approval.



Boeing's CST-100 Starliner spacecraft on the launchpad at Cape Canaveral.

Federal Trilateral Space Medicine Board

To enhance federal leadership in aerospace health and safety, and in response to the rapidly evolving human presence in space, the OCHMO, FAA, and Space Force established the Federal Trilateral Space Medicine Board (FTSMB) in October 2023. Policy staff led the development of the Board's charter with internal and external stakeholders and members. The FTSMB serves as a forum for discussing lessons learned, policies, issues, and gaps, as well as sharing knowledge of space medicine and human systems integration, with the goal of enhancing and maintaining the safety of human spaceflight, as well as ground-based and space-based space operations. Within OCHMO, this board replaces the Medical Policy Board.

Air Force Medical Service Collaboration

In the fall of 2023, the Policy team executed a Memorandum of Understanding (MOU) between NASA and the United States Air Force Medical Service (AFMS). The MOU extends and enhances the longstanding partnership related to space medicine in support of current and next-generation space exploration, the discovery of new insights in medicine, and the accomplishment of disparate but related missions. This collaborative approach will advance the parties' interests in space and leverage existing knowledge, best practices, structures, and processes that benefit the agencies' human health and readiness efforts as well as the cost-effectiveness, sustainability, and interoperability of their respective missions.

Other Policy Accomplishments

The OCHMO Policy team also made significant progress on policy development that will be published in CY 2024 or early CY 2025. These include the following:

Protection of Human Research Subjects—revisions to human research requirements, standards, and data security, including updates on the use of human research genetic testing.

Quality Assurance of the NASA Medical Care System—extensive revision for clarity and ease of use for both practitioners and internal auditors.

Mission Operations—several policies in revision to clarify the HMTA, standards, and other operational requirements.

Care and Use of Animals—revisions centered around specific roles and responsibilities.



A United Launch Alliance Atlas V rocket with Boeing's CST-100 Starliner spacecraft aboard launches from Cape Canaveral Space Force Station.

Collaborations and Work Groups

The OCHMO Policy team actively collaborated with counterparts in the Office of the Chief, OSMA, and the Office of the Chief Engineer (OCE) to ensure that policies were consistent across the three organizations. The team also regularly reviewed draft versions of other organization and program policy directives to determine accuracy and impacts to, and possible mitigations of, issues related to crew and occupational health, safety, and performance. In the development of OCHMO policies, the policy staff closely collaborated with experts in the Office of the General Counsel (OGC) and the Office of Interagency and International Relations (OIIR) to help reinforce best practices and ensure compliance with applicable Agency, federal, and international laws, regulations, directives, and agreements.

In the course of working on several draft directives in 2023, Policy staff discovered that several key terms referring to astronauts, International Partners, and spaceflight participants commonly used in human spaceflight were defined differently within NASA and externally, including by the FAA and commercial industry, and among different statutes, regulations, agreements, and directives. With the evolution of NASA's human spaceflight platforms from the ISS to a combination of Artemis and various commercial programs, along with the new regulatory environment required for U.S. commercial vehicles, Policy personnel recognized the increasing need to ensure that common definitions and terms are used across all spaceflight entities. The consistent use of definitions and terms may reduce uncertainty and possible cost and schedule impacts. The Policy team will continue working with stakeholders in 2024 to identify and collaborate on mutually agreeable common terminology and use.

HEALTH AND MEDICAL TECHNICAL AUTHORITY



NASA's Orion spacecraft for the Artemis I mission splashes down in the Pacific Ocean after a 25.5-day mission to the Moon.



"I am blessed to have human spaceflight as a career, and perhaps even more so to have a truly stellar team with whom to share the journey. Their dedication to understanding and overcoming the challenges of the human system in space is truly inspiring. Their passion and tireless efforts not only enhance our capabilities in space exploration but also symbolize human spirit that ultimately enables it. I deeply appreciate this exceptional team as we push the boundaries of human spaceflight and help to create tomorrow from today."

Neal Zapp

Manager, HMTA, and Chief Health and Performance Officer, Space Operations Mission Directorate (SOMD) and Exploration Systems Development Mission Directorate (ESDMD)



Debra Berdich

Deputy Manager, HTMA, and Deputy Chief Health and Performance Officer, SOMD and ESDMD

Priorities and Initiatives

- ✓ Provides for the direct management of the health and performance of flight crews in operations and the protection of human health.
- ✓ Administers spaceflight program support for the following programs: Gateway Program (GP), Orion, Human Landing System (HLS), Exploration Ground System (EGS), International Space Station (ISS), Commercial Crew Program (CCP), Commercial LEO Development Program (CLDP), and Extravehicular Activity (EVA) and Human Surface Mobility (HSM) Program (EHP). Within these programs, there are currently 32 distinct areas of programmatic content.



<https://www.nasa.gov/ochmo/health-operations-and-oversight/health-and-medical-technical-authority/>

Accomplishments

Spaceflight Program Support

The HMTA continued its involvement with spaceflight missions and provided real-time support to technical launch and landing events and readiness assessments, including NASA's SpaceX CCP, Crew-5's landing to Earth, Crew-6's launch and landing, Crew-7's launch, and Northrop Grumman's 19th Commercial Resupply Services mission to the ISS. In addition, HMTA oversaw the readiness assessment for the return of

Russian Soyuz rocket expeditions (Soyuz 70S and 69S). These continuous efforts and contributions are key components to enabling Low Earth Orbit missions.

HMTA staff completed the adjudication of HLS requirements as tailored from OCHMO Human System Standards in conjunction with the HLS Program for both SpaceX Artemis IV and Blue Origin Artemis V.

Aeronautics Support

OCHMO continued to support Aeronautics in both the design and development activities as well as supporting ongoing operations. Developmental engagement included HMTA support for the X-59 and X-57 projects to ensure that they were safe for the crew as well as optimized for performance.

Operational support included continuing to optimize the Aviation Medical Certification policies, as well as supporting coordination with the Aviation Management and Safety offices on issues related to pilot age limits, as well as commercial pilot medical certification.



NASA's X-59 quiet supersonic research aircraft sits on the ramp at Lockheed Martin Skunk Works in Palmdale, California. The X-59 was built to demonstrate the ability to fly faster than the speed of sound while reducing the typically loud sonic boom.

Technical Interchange Meetings

HMTA subject matter experts (SMEs) held technical interchange meetings (TIMs) over several months to assess and chart the path for enabling emergency return configuration options for an ISS crewmember aboard a Crew-5 U.S. Crew Dragon Vehicle to safely return from the ISS. The assessments included a review of crew location and associated loads and dynamics, ergonomics, and potential health issues such as CO₂ and body temperature. Post the Crew-5 mission, SMEs continued to assist the CCP and ISS by assessing alternate configurations, such as crew swaps, for subsequent missions. This work reiterates HMTA SMEs' vital importance for evaluating vehicle and operational options to enable mission success and to mitigate crew safety risks.

HMTA-Provided Trainings

HMTA staff conducted eight training sessions at JSC. These one-day training sessions focused on three specific areas: Mishap History and HMTA Formulation, HMTA Organization, and HMTA Implementation. The goal of the comprehensive training was to provide participants with in-depth knowledge about the inner workings of technical authority and highlight HMTA's role in supporting NASA spaceflight missions and development programs. Over 100 participants successfully completed the training.

Spaceflight Forensics Summit

OCHMO held an inaugural Spaceflight Forensics Summit in April 2023 with industry experts with the intent to establish a community of practice to develop approaches to human spaceflight mortality response. Novel frameworks to on-orbit spaceflight mishap fatalities are required as NASA

HMTA also made major strides towards developing communication tools and executing TIMs to discuss OCHMO's unique human spaceflight knowledge with commercial industry stakeholders and other government agencies. Key topics discussed were mishap readiness, human spaceflight physiology, and medical operations. The TIMs helped to streamline communications and deepen the understanding of varying areas of human spaceflight expertise. Enabling a framework to capture and share information strengthened HMTA's ability to aid NASA in developing a robust commercial human spaceflight economy.

For the first time, the HMTA team welcomed first-year residents in the Aerospace Medicine program at UTMB to its training roster. Training was also expanded to include Artemis International Partner Flight Surgeons.

A new version of the material was also created to enable executive session training. Due to increased demand, HMTA staff will continue to offer informed trainings for current and future personnel.

prepares to undertake more long-duration and commercial missions. Through these discussions and the fruit they bear, OCHMO and NASA are helping to address the challenges that come with a new generation of space exploration, not just for the agency, but for the whole space industry.

Collaborations and Work Groups

Members of the HMTA team actively participated in the Agency Risk Management Working Group (ARMWG) to help identify, rank, assess, and mitigate risks, challenges, concerns, and opportunities related to threats to mission support directorate performance objectives.

HMTA staff also routinely engaged in updating NASA's Human-Rating Requirements for Space Systems Procedural Requirement (NPR 8705.2C), led by OSMA. Updates were based on the proposed consolidation of human-rating requirements for Artemis missions and the review of potential gaps and updates to human rating for missions to Mars.

International Relations

OCHMO and HMTA implemented monthly meetings (tag-ups) with the Artemis International Chief Medical Officers for technical interchange related to Artemis missions. The establishment of monthly tag-ups was a direct follow-up action to the first Artemis Multilateral Medical Policy Board and first Artemis Multilateral Medical Operations Board meetings with CSA, ESA, and JAXA held at NASA Headquarters. The board meetings were essential first steps to identifying process, roles, and responsibilities and to discussing Artemis medical policy.

OCHMO leadership and HMTA staff engaged in a variety of international discussions to share information about NASA's space missions.

Speaking events included the following:

- At the University of Strathclyde in Glasgow, Scotland, OCHMO participated in student lectures about research possibilities and operations in austere environments as equivalent to spaceflight missions.

In collaboration with Moon to Mars (M2M), the Mars Campaign Office (MCO), the Human Research Program, the Environmental Control and Life Support System (ECLSS)—Crew Health and Performance (CHP) Systems Capability Leadership Team (SCLT), and multiple stakeholders, HMTA developed and implemented a process to prioritize human capability gaps for M2M that should inform investment decisions by resource managers. The process was developed to provide resource decision makers with a clear message of community-generated human system exploration capability priorities. Creating a community of practice was necessary to transparently identify eight top human system needs and review and assess the needs.

- At the University of Edinburgh in Edinburgh, Scotland, OCHMO contributed to discussions about supercomputing, the forefront of genomics, biomechanical engineering, and quantitative human factors with respect to potential applications for human spaceflight.
- OCHMO, along with leadership from JSC's Flight Operations Division, led a panel discussion on space medicine, the growing and changing commercial flight industry, and the Artemis Moon to Mars Program at the World Extreme Medicine Conference in Edinburgh, Scotland.
- OCHMO participated in the United Nations/World Health Organization International conference on Space and Global Health in Switzerland. Topics discussed included health impacts related to de-/reforestation, climate change, population density, and medical innovation aboard the ISS.
- OCHMO also facilitated a medical expert panel meeting for members of the North Atlantic Treaty Organization Special Operations Forces Command (NATO SOFCOM).

HUMAN SPACEFLIGHT AND AVIATION STANDARDS



The Orion spacecraft docked to the Gateway space station.





“It is an awesome opportunity to work within OCHMO and with the dedicated Standards Team to enable human spaceflight across NASA, the commercial industry and our international partners. The Standards team is a diverse, talented and energetic team that pushes every boundary to ensure that we provide the best possible information to facilitate human spaceflight.”

Dave Francisco

Technical Fellow for Health, Medical, and Performance Spaceflight Standards

Priorities and Initiatives

-  Creates, reviews/validates, and adjudicates all NASA human health, medical, and performance standards.
-  Develops the technical requirements and documentation necessary to successfully implement NASA programs and the commercialization of human spaceflight.
-  Collaborates with NASA as well as national and international subject matter experts to ensure that best practices and data are utilized to develop new and/or update existing spaceflight and aviation standards according to the needs of each NASA mission.

<https://www.nasa.gov/ochmo/hsa-standards/>



Accomplishments

NASA-STD-3001 Spaceflight Human-System Standard, Volumes 1 and 2

The Standards team updated both volumes of NASA-STD-3001 (Spaceflight Human-System Standard, Volume 1: Crew Health and Volume 2: Human Factors, Habitability, and Environmental Health) to address technical needs in preparation for lunar and Mars missions and Low Earth Orbit (LEO) commercial missions; the team also identified gaps in requirements in vehicle design and for the protection of crew health. The updates included the first review of the standards conducted by Commercial Industry and International Partners.

Technical Briefs

The Standards team developed Technical Briefs to integrate content from multiple standards and provide a quick, informative resource to reference when developing hardware, systems, and vehicles and for understanding human needs and limitations in human spaceflight. To date, 43 briefs have been developed and are available to the public. OCHMO has distributed and discussed the briefs at industry and international events, including Commercial LEO workshops in support of the Commercial LEO Development Program.

Journal Publication

The Standards team had an article titled “NASA Space Flight Human-System Standard: Enabling Human Spaceflight Missions by Supporting Astronaut Health, Safety, and Performance” published in the *Nature Partner Journals Microgravity*. The article described NASA’s approach to establishing and maintaining a set of Agency-level Space Flight Human-System Standards that enables spaceflight missions by minimizing health risks to astronauts, providing vehicle design parameters, and supporting the performance of both flight and ground crews.



NASA’s Space Launch System rocket carrying the Orion spacecraft launches on the Artemis I flight test at NASA’s Kennedy Space Center in Florida.

Technical Interchange Meetings

Several Standards staff members attended the Food and Exercise TIM hosted by the Commercial LEO Development Program (CLDP) to discuss the importance of food systems in spaceflight, challenges and opportunities in designing a spaceflight food system, nutritional requirements for astronauts, exercise countermeasures to mitigate spaceflight-associated physiological decrements, and the challenges of designing an effective and vehicle-friendly exercise system. OCHMO is working with the FDA and the NSF to review terrestrial food standards to consider updates for space food.

International Relations

Key members of OCHMO, including Standards staff, met with ISRO in India. The goal of this meeting was to share best practices and provide interpretation of NASA's Standards for Human Spaceflight. Technical discussions were held on human health and performance as related to considerations for spacecraft design, including, but not limited to, medical support, protection of crew from launch and landing loads, and environmental system design. OCHMO will continue to facilitate subject matter expert discussions in the future with ISRO in support of NASA's goal to build strategic partnerships within global spaceflight communities.



Engineers and technicians at NASA's Johnson Space Center in Houston test spacesuits for astronauts to wear in the Orion spacecraft.

Collaborations and Work Groups

The Standards team, in collaboration with the NASA Engineering and Safety Center (NESC) and OSMA, conducted a review and update of human-systems requirements on the design of space systems to support crews' capability to conduct safe, effective, and efficient maintenance. The team reviewed past and current maintainability-related standards within NASA, other government agencies (DOD, FAA, NRC), and industry organizations (IEEE, SAE) to identify potential gaps in current NASA standards, and they consulted a wide range of sources and interviewed 50 SMEs to understand NASA's maintenance practices and challenges, maintenance-related incidents on prior NASA missions, the latest trends in designing for maintainability and conducting maintenance, and performing maintenance in extreme environments by a small team. The process yielded a final set of 22 technical requirements that were added to NASA-STD-3001, Vol. 2, Rev. D.

The Standards team and other members of OCHMO participated in NASA's Crew Mortality Summit. The summit was developed based on the need to further discuss policy development and other related tasks on the occasion that tragic events occur while in space. Various specialties, including astronautics, flight medicine, planetary protection, coronial and forensic pathology, space taphonomy, anthropology, and forensic entomology were represented at the Summit. Attendees discussed actions related to protection of the crew, medico-legal aspects, planetary protection, forensics, and the handling of crew remains, as well as guidance needed for agencies and countries in the event a crewmember should perish during a visit to space or while on a mission. The Standards team developed and added mortality in space standards to NASA-STD-3001; they are being used for Artemis, and OCHMO is implementing NASA-wide mortality policies in 2024.

The team also initiated a review of proposed Spacecraft Maximum Allowable Concentration (SMAC) for hydrogen sulfide (H_2S) via a panel of experts external to NASA. The panel feedback and comments were provided to the JSC Toxicology group for consideration in finalizing the proposed H_2S SMAC level.

OFFICE OF RESEARCH ASSURANCE



HERA is a unique 650-square-foot habitat split among two floors and a loft, designed to serve as an analog for isolation, confinement, and remote conditions in exploration scenarios.








“Every day I am amazed by the team members of the Office of Research Assurance and grateful to get to work with them daily. They are dedicated to facilitating research in support of NASA’s mission by ensuring the protection of participants’ rights and welfare through education and collaboration.”

Marisa Covington

Director, OORA, and Chair, NASA Institutional Review Board

Priorities and Initiatives

-  Provides oversight for research integrity and protection of human subjects and animal research across NASA centers and on the ISS.
-  Manages the structure and activities of the Bioethics Advisory Panel (BAP), Human Research Multilateral Review Board (HRMRB), and NASA Institutional Review Board (IRB), including the use of eIRB, an electronic processing system.
-  Establishes research policies to address operational and ethical concerns and provides informational and educational materials to researchers, members of the IRB, the HRMRB, the Flight Institutional Animal Care and Use Committee (FIACUC), the Animal Policy Review Board, and other NASA stakeholders.
-  Ensures ethical and institutional compliance with federal and state laws and regulations, institutional policies, and guidelines governing human and animal research protection.
-  Focuses on areas including protections for human subjects; animal welfare research; education about and compliance with research ethics and regulatory practices for staff, investigators, and research volunteers; and the office’s role as a research liaison with other NASA and external organizations that perform exploration or fundamental life sciences.

<https://www.nasa.gov/institutional-review-board/>



Accomplishments

Bioethics Advisory Panel

At the request of OORA, the BAP, which was composed of internal and external experts, provided recommendations on ethical issues surrounding mortality during human spaceflight and animal research.

The BAP recommended that, when warranted, surviving crewmembers should not have the option to gather biological samples or perform an autopsy despite any added trauma that may come from completing these tasks. They also indicated that all religions offer exceptions that will allow these procedures during spaceflight. OORA agreed with the Panel's recommendation

and acknowledged that education and training on mortality issues during spaceflight should be conducted with JSC's Flight Operations Directorate.

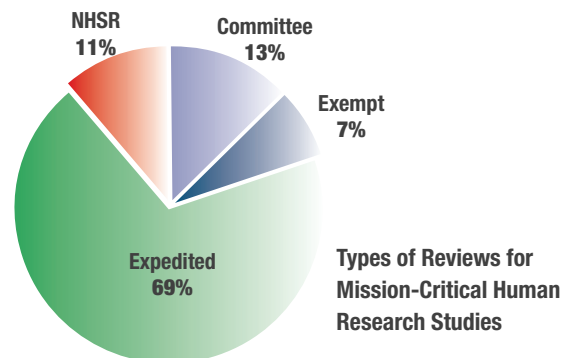
OORA also asked the BAP to provide thoughts on whether or not it is reasonable to consider a crewmember's comfort with research procedures, moral stance regarding use of animals in research, and proficiency when conducting animal research. The BAP advised that while it is acceptable to consider these things, the expectation of performing tasks that generate data and science still exists.

NASA Institutional Review Board

The NASA IRB facilitates research in support of the agency's mission by ensuring the protection of participants' rights and welfare through education and collaboration.

During 2023, the NASA IRB held 13 board meetings to accommodate committee, exempt, expedited, and not-human-subjects-research (NHSR) reviews of mission-critical human research studies. In addition, the IRB worked with designated reviewers to evaluate 575 research study submissions. Overall, the volume of research study submissions decreased following the implementation of the Revised Common Rule, which eliminated the continuing review requirement for most minimal-risk studies.

Further, IRB staff implemented policies and Standard Operating Procedures (SOPs) to reduce the work burden on Principal Investigators (PIs). For example, the IRB implemented prior approval of contingency plans to allow PIs to specify the parameters and conditions under which certain tests may be repeated. This action resulted in fewer reports of new information (RNIs) and modification submissions. In addition, SOP-420: Exempt Reviews was updated to allow for a limited number of minor revisions to exempt



studies without the need to file a modification with the IRB. With the reduction in volume of administrative-type reviews, IRB staff was able to focus on more substantive issues, such as providing better reviews of submissions with more nuanced and service-focused feedback for PIs.

The NASA IRB also expanded its oversight of human subject research in commercial spaceflight programs by adding Axiom research to its portfolio and acting as the official IRB of record for research conducted on the ISS. Axiom research included collaboration with investigators from Axiom, Saudi Arabia, the Massachusetts Institute of Technology, the University of California at San Diego, and the ISS Payload Program Office (OZ).

IRB experts hosted educational sessions and developed ten SOPs and nine guidance documents to provide instructions on navigating IRB research requirements. These actions greatly improved the quality of Axiom research study submissions.



NASA astronaut Jeanette Epps documents research hardware working in the International Space Station's Destiny laboratory module.

Human Research Multilateral Review Board

The HRMRB ensures that research on the ISS involving human subjects is safe, ethical, and coordinated between NASA and its International Partners (IPs).

In 2023, the HRMRB reviewed 210 protocols. In addition, the board developed and updated SOPs and templates to ensure consistency in procedures used by the board for research reviews.

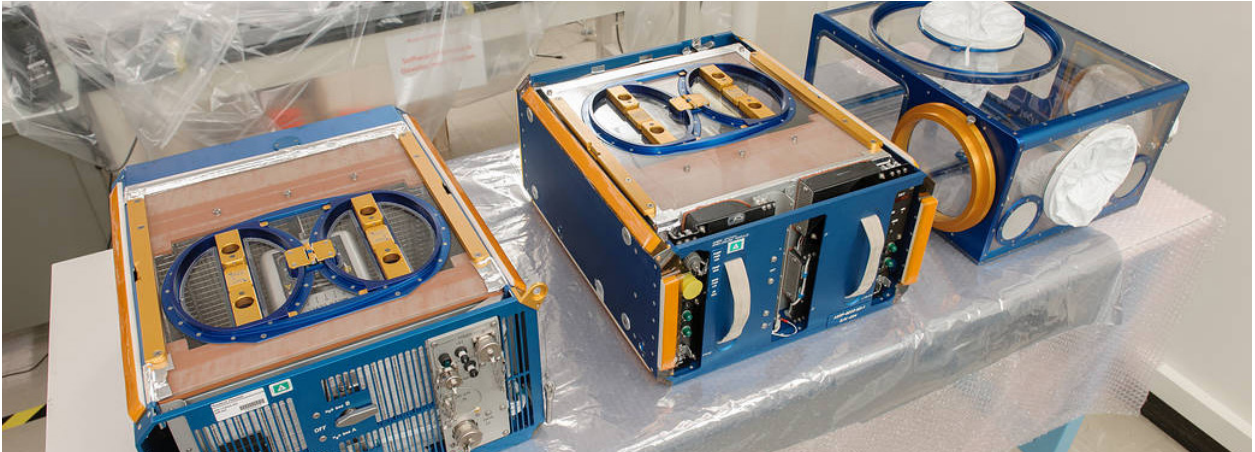
NASA Gateway Board

OORA led efforts to charter a Gateway Program board with representation from IPs that are directly involved in Gateway activities, similar to the HRMRB, for human subject research within the Gateway Program. The first board meeting is scheduled for the fall of 2024.

Human Subject Compliance and Quality Improvement Program

OORA established a Human Subject Compliance and Quality Improvement (CQI) program to facilitate the verification of research and support compliance with relevant federal regulations, NASA policies, and IRB-approved protocols. In collaboration with PIs, the program plans to conduct site visits, provide outreach to the NASA research community through targeted education, and proactively identify and address potential compliance concerns.

OFFICE OF THE CHIEF VETERINARY OFFICER



Rodent Research Habitat module for SpaceX 13.



“It is a true honor to work side-by-side with the innovative and committed team members within the Office of Research Assurance who passionately dedicate themselves to facilitating the cutting-edge research that will help take humanity safely to the moon, Mars, and beyond...and back!!”

Dr. Chad D. Foster, DVM

Chief Veterinary Officer (CVO), OCVO

Priorities and Initiatives

- ✓ Serves as NASA's Subject Matter Expert on regulated animal activities and protects agency interests related to the care and use of animals; facilitates cutting-edge science and ensures public confidence by guaranteeing that the highest standards of animal welfare are maintained in the design and execution of research.
- ✓ Establishes agency-level policy and provides strategic direction for NASA's animal programs and advises the NASA Flight Institutional Animal Care and Use Committee (FIACUC) and Animal Policy Review Board (APRB).
- ✓ Collaborates with OORA to provide regulatory oversight of animal care programs and animal research (funded or supported by NASA) to confirm compliance with or investigate noncompliance with federal and state regulations, as well as NASA policy and standards, and address concerns regarding animal welfare.
- ✓ Develops agency standards for spaceflight hardware related to the care and use of animals and authenticates hardware before use in space missions.
- ✓ Provides education and consultation to internal and external stakeholders regarding NASA's animal programs and animal-related concerns or impacts.

<https://www.nasa.gov/ochmo/health-operations-and-oversight/chief-veterinary-officer/>



Accomplishments

Animal-Use Protocols

In 2023, the OCVO focused on improving the standardization and efficiency of development and review processes for animal-use protocols by doing the following:

- Developing and implementing a unified approach that greatly facilitated inter-center coordination of animal activities and ensured that all aspects of animal care and use were appropriately addressed in review and approval processes. The approach involved the use of a newly created standardized template and was adopted by all NASA IACUCs.
- Establishing a new collaborative approach to effectively meet the federal mandate for conducting veterinary consultations during the development of animal-use protocols that involve more than a singular NASA animal care program. This approach entailed creating a working group composed of veterinarians from all NASA centers and facilities performing veterinary consultations.
- Implementing an innovative approach to streamline review and approvals through the use of a single-protocol template that covers all aspects of research (ground and flight). This approach ensured that all animal programs followed the same guidelines and increased efficiency to support the ISS's goal of having protocols approved four months prior to launches.

Research Mission Success Tiger Team

In 2023, the CVO served as the Co-Chair of the Research Mission Success Tiger Team impaneled by the ISS Research Integration Office to identify and address concerns related to the planning, coordination, and execution of increasingly complex research operations on the ISS. The Tiger Team focused on mission execution, crew training, IACUC protocol review and post-approval monitoring, research program development and implementation, and other complex payload operations. As a result of the joint work efforts, numerous processes and policies were



NASA astronaut Scott Kelly handles the Rodent Research Facility aboard the International Space Station.

implemented and significant improvements in execution of complex research operations were made. The work of the splinter teams is ongoing.

NASA-Supported (Extramural) Animal Use

The OCVO established new processes for reviewing and approving regulated animal activities supported by NASA (through funding, personnel, equipment, or facilities) but performed by external partners or agencies. The CVO worked closely with engineers at Glenn Research Center, provided consultation, and performed regulatory oversight for a NASA-funded study that aims to validate the use of non-animal alternatives for FAA-, U.S. Air Force-, and NASA-mandated bird-strike testing. This study demonstrates NASA's commitment to the reduction and replacement of animals in research and testing, where feasible.

Animal Policy Review Board

The OCVO hosted the APRB in May 2023 at KSC. Fifty participants, including representatives from NASA's animal programs, OORA, and ISS operations, were given the opportunity to provide input into CVO's initiatives, including the standardized animal-use protocol template and single-protocol review process.

Flight Institutional Animal Care and Use Committee

The FIACUC provides regulatory oversight of animal use in research on the ISS. In 2023, the FIACUC successfully negotiated a Public Health Service Assurance for the ISS flight program. This internationally recognized accomplishment demonstrated that the flight animal care and use program, despite the multitude of challenges related to maintaining an animal research program in Low Earth Orbit, maintains the highest standards of animal welfare and regulatory oversight and is critical to sound research solicitation and the validation of published research results.

The FIACUC also worked closely with the CVO and ISS Tiger Team to establish and implement process improvements to enhance the efficiency of protocol development, reviews, and approvals and build collaborative relationships with stakeholders.

By the end of 2023, the FIACUC had reviewed and approved three animal-use protocols and thirteen protocol modifications.

Collaborations and Work Groups

Throughout 2023, the OCVO continued its engagement with external stakeholders. The CVO served as an ex officio member of the National Academies Institute of Laboratory Animal Research Roundtable and as NASA representative to the 21st Century CURES Act working group. In addition, OCVO staff provided briefings to the astronaut corps, the Payload Operations Integration Working Group (POIWG), and the Natural Resources Council, and lectured at several research community events, including the American Veterinary Medical Association, the Laboratory Animal Managers Association, Public Responsibility in Medicine and Research (PRIMR), and school career days.

The OCVO also collaborated with the USDA Animal Welfare Information Center to provide an educational webinar to NASA IACUCs, research sponsors, and other rodent research program personnel on conducting effective literature searches for alternatives in the development of animal-use research protocols.

Lastly, the OCVO team worked with JAXA on the development and execution of their animal research on the ISS and guided JAXA and ESA staff representing their agencies' support of the International Space Life Sciences Working Group's pursuit of international standards for animal care and use in space.



Anne McClain, Rodent Research-8 (RR-8), examining the physiology of aging and the effect of age on disease progression using groups of young and old mice flown in space and kept on Earth.

EXTREME ENVIRONMENTS AND ANALOGS



Expandable habitat at McMurdo Station in Antarctica.



“It is inspiring to work with the scientists and managers who design studies for analogs, and the amazing people who work in those analogs. They all are empowering our efforts in exploration while making the world a better place today.”

Marc Shepanek

Program Lead, Extreme Environments and Analogs

Priorities and Initiatives

- ✓ Conducts research and compiles data on overarching human health hazards, such as space radiation, isolation and confinement, distance from Earth, gravity, and closed or hostile environments, during space missions.
- ✓ Contributes to ground-based research results to help formulate NASA policy, standards, and requirements to keep people healthy, safe, and productive on the ground and in space.



<https://www.nasa.gov/ochmo-extreme-environment-analogs-assessment-program/>

Accomplishments

Analogs

In 2023, Human Exploration Research Analog (HERA) and Crew Health and Performance Exploration Analog (CHAPEA) teams gathered data on human factors, group dynamics, and nutrition in isolation in a controlled environment at Johnson Space Center.

NASA teams conducted research in group dynamics and individual adaptation in the isolated and confined extreme environments of Antarctica at McMurdo, South Pole, and Palmer Stations. As a result, a draft agreement for partnership with the Antarctic Stations of the Australian Antarctic Division is in process and linked with the newly established Australian Space Agency.

Collaborations and Work Groups

The Analogs team interacted with SCAR and the Joint Expert Group on Human Biology and Medicine to address a range of activities, including COVID protocols, avian flu, and human factors and countermeasures to the physical and psychological stress of living in an isolated and confined extreme environment.

The National Academy of Sciences Committee on Aerospace Medicine and Medicine of Extreme Environments engaged with OCHMO to assess current and upcoming clinical challenges and potential countermeasures for space missions.

The Analogs team continued discussions and support for the development, evolution, and increasing independence of the Civilian Aerospace Medicine Residency at UTMB, including integration of training and support for commercial space missions.



McMurdo is the largest Antarctic station. It was built on the bare volcanic rock of Hut Point Peninsula on Ross Island.

OTHER OCHMO ACHIEVEMENTS

White House Cancer Moonshot Initiative

In 2023, OCHMO's Director of Health Operations and Oversight served as the Deputy Administrator for the White House Cancer Moonshot initiative. This initiative, supported by the American Cancer Society (ACS) and American Cancer Society Cancer Action Network (ACS CAN), mobilized efforts to achieve two goals from President Biden and First Lady Jill Biden to (1) prevent more than four million cancer deaths by 2047 and (2) improve the experience of people who are touched by cancer.

Health Operations and Oversight contributed to creating three task forces; distributed campaigns encouraging cancer screenings; coordinated astronaut visits to pediatric cancer hospitals; and led agency-wide efforts to help identify pollutants and clusters of cancer using data from NASA's Tropospheric Emissions: Monitoring Pollution (TEMPO), a space-based instrument used to collect high-resolution measurements of ozone, nitrogen dioxide, and other pollutants. Data produced from this instrument will revolutionize air quality forecasts.



NASA Administrator Bill Nelson delivers remarks to highlight NASA's contribution to the program.

TREAT Astronauts Act

OCHMO continues to provide for the medical and psychological monitoring and diagnosis of former astronauts for conditions potentially associated with spaceflight and to provide for the treatment of former astronauts for spaceflight-associated conditions.



NASA astronaut and Expedition 68 Flight Engineer Frank Rubio is pictured during a spacewalk while tethered to the International Space Station's starboard truss structure.

MESSAGE FROM THE DEPUTY CHIEF HEALTH AND MEDICAL OFFICER



At the end of 2022, as NASA and the world emerged from the most profound pandemic in over 100 years, OCHMO continued to provide exceptional services and support to employees, the agency, and NASA spaceflight missions. Our office leaned forward to have answers to questions before they were asked and were readily available to provide guidance where needed. From ensuring that operational missions and research activities excelled in both a safe and productive manner to providing technical expertise to NASA programs and projects and strengthening employees' ability to operate in any location, OCHMO teams kept a steady pace while functioning in constantly changing environments.

The last few years have seen an unprecedented expansion of the number and types of human space-related activities involving NASA. In 2023, our office rose to meet the ever-increasing need to provide health and medical subject matter expertise to over 20 design and development efforts, campaigns, and initiatives, including the Aeronautics X-59, Artemis, and Moon to Mars Programs. OCHMO staff worked diligently throughout the design processes to educate and advise stakeholders and address risks as they arose. The team never shied away from asking tough questions and driving to safer alternatives, while always using an evidence-based approach.

OCHMO touches every aspect of NASA. Although we are small in number, the value we bring to NASA is immense. Humans are involved in everything NASA does, and ensuring that we optimize human performance while maintaining or improving our employees' well-being is our top goal.

It has been an honor and a pleasure to work with such an exceptional group of professionals this past year.

A handwritten signature in black ink, reading "Vincent J. Michaud". The signature is fluid and cursive, with a large, sweeping flourish at the end.

Sincerely,
Vincent J. Michaud, MD, MPH, FAsMA

BY THE NUMBERS

Hosted 10th Annual NASA Moves!

3,500
EMPLOYEES




700
MILLION STEPS.

30,000+
EMPLOYEES



received EAP support.

4
POLICIES WERE UPDATED AND PUBLISHED.



NPD 1800.2 and NPR 1800.1, Occupational Health Program/OCHMO-CHTR-301A, Laser Safety Review Board/MOU with USAF


Hosted training for **230+** OCCUPATIONAL HEALTH AND SAFETY PROFESSIONALS from all NASA Centers and in **9** DISCIPLINES.



Spearheaded virtual health promotions for **1,600+** EVENTS.



10,000 PERIODIC EXAM PROTOCOLS updated in the EHRs database.



EHRs

75 SAFETY ORIENTATIONS conducted for employees.



Offered **58** LUNCH-AND-LEARN WEBINARS to employees for **7,865** ATTENDEES = **280%** INCREASE IN ATTENDANCE from CY22.




Evaluated **575** SUBMISSIONS for proposed research initiatives.



2 NEW POLICIES ESTABLISHED.
NID 1850.141, Appropriate Credentials for NASA Flight Surgeons
New Charter: FTSMB (Trilateral)




Conducted **20** TECHNICAL INTERCHANGE MEETING (TIM) SESSIONS to ensure mission success and minimize crew safety risks.



8 POLICY CHANGES are in the works.



Supported **9** SPACEFLIGHT PROGRAMS with **32** SWIMLANES OF CONTENT supported by HMTA.



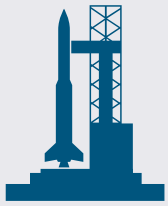
Hosted **9** three-day HMTA 101 TRAINING SESSIONS for over **100** PARTICIPANTS.



Created **20+** RESEARCH SOPs AND GUIDANCE DOCUMENTS to improve quality of submissions to and reviews conducted by NASA IRB.



BY THE NUMBERS



Added
22
TECHNICAL REQUIREMENTS
to NASA's Human Health,
Medical, and Performance
Spaceflight Standards, Volume 2.



CVO provided oversight
and support for at least
12 ANIMAL-USE PROTOCOLS
at **4** CENTER IACUCs,
all of which are AAALAC-
accredited and PHS-assured.



To date, has created
43 TECHNICAL BRIEFS
to aid with developing hardware systems and
vehicles and understanding human needs
and limitations in spaceflight.



CVO successfully completed
1ST
HYBRID
(in-person and virtual) CVO internship with
a comparative medicine resident,
a veterinarian trained in laboratory animal medicine.

Supported



7
ANALOGS:
Antarctic, Arctic, Houghton Mars,
Desert RATS, Hera, Chapea, Analogs.



Provided direct on-console support
to ISS crewmembers for
45 ANIMAL-
RELATED
research activities.

Supported development and execution of



MORE
THAN **24** RESEARCH
PROTOCOLS
in behavior and performance, group dynamics,
individual adaptation to isolation and confinement,
viral reactivation, and nutrition in
extreme environments.

ABBREVIATIONS

A

AAALAC: Association for Assessment and Accreditation of Laboratory Animal Care

ABPM: American Board of Preventive Medicine

ACF: Animal Care Facility

ACLAM: American College of Laboratory Animal Medicine

ACOEM: American College of Occupational and Environmental Medicine

ACOEP: American College of Osteopathic Emergency Physicians

ACS: American Cancer Society

AFMS: Air Force Medical Service

AHA: Agency Honor Awards

AMA: Aerospace Medical Association

APRB: Animal Policy Review Board

ARC: Ames Research Center

ARMWG: Agency Risk Management Working Group

ASA: Australian Space Agency

B

BAP: Bioethics Advisory Panel

C

CAN: Cancer Action Network

CCP: Commercial Crew Program

CDFF: Commercial Destination-Free Fliers

CHAPEA: Crew Health and Performance Exploration Analog

CHP: Crew Health and Performance

CIP: Certified IRB Professionals

CLDP: Commercial LEO Development Program

CQI: Human Subject Compliance and Quality Improvement program

CSA: Canadian Space Agency

CVO: Chief Veterinary Officer

D

DAF: Department of the U.S. Air Force

DOD: U.S. Department of Defense

DOL: U.S. Department of Labor

E

EAP: Employee Assistance Program

ECLSS: Environmental Control and Life Support System

EGS: Exploration Ground System

EHP: Extravehicular Human Surface Mobility Program

EHR: Electronic Health Records System

EH: Environmental Health

EIC: Earth Information Center

EMD: Environmental Management Division

EPA: Environmental Protection Agency

ESA: European Space Agency

ESDMD: Exploration Systems Development Mission Directorate

EVA: Extravehicular Activity

F

FAA: Federal Aviation Administration

FDA: Food and Drug Administration

FIACUC: Flight Institutional Animal Care and Use Committee

FTSMB: Federal Trilateral Space Medicine Board

ABBREVIATIONS

G

GP: Gateway Program

H

HELIOS: High Energy Laser with Integrated Optical-dazzler and Surveillance

HEO: Human Exploration and Operations

HERA: Human Exploration Research Analog

HHPD: Human Health and Performance Directorate

HLS: Human Landing System

HMTA: Health and Medical Technical Authority

HQ: Headquarters

HRP: Human Research Program

HSM: Human Surface Mobility

I

IACUC: Institutional Animal Care and Use Committees

IAQ: Indoor Air Quality

IEEE: The Institute of Electrical and Electronics Engineers

IP: International Partners

IRB: Institutional Review Board

ISRO: Indian Space Research Organisation

ISS: International Space Station

ISSNL: ISS National Laboratory

IT: Information Technology

IVOD: Internet Voice Distribution System

J

JAXA: Japan Aerospace Exploration Agency

JSC: Johnson Space Center

K

KSC: Kennedy Space Center

L

LEO: Low Earth Orbit

M

M2M: Moon to Mars

MCO: Mars Campaign Office

MOU: Memorandum of Understanding

MPB: Medical Policy Board

MSD: Mission Support Directorate

N

NARA: National Archives and Records Administration

NAS: National Academy of Sciences

NASA: National Aeronautics and Space Administration

NATO: North Atlantic Treaty Organization

NESC: NASA Engineering and Safety Center

NHSR: Not Human Subjects Research

NID: NASA Interim Directive

NIOSH: National Institute for Occupational Safety and Health

NODIS: NASA Online Directives Information System

NPD: NASA Policy Directive

NPR: NASA Procedural Requirement

NRC: Nuclear Regulatory Commission

NSF: National Science Foundation

O

OCE: Office of the Chief Engineer

OCHMO: Office of the Chief Health and Medical Officer

OCIO: Office of the Chief Information Officer

OCQI: Compliance and Quality Improvement

OCVO: Office of the Chief Veterinary Officer

OGC: Office of the General Counsel

ABBREVIATIONS

OH: Occupational Health

OHP: Occupational Health Program

OIIR: Office of Interagency and International Relations

OMB: Office of Management and Budget

OORA: Office of Research Assurance

OSMA: Office of Safety and Mission Assurance

OZ: ISS Payload Program Office

P

PHS: Public Health Service

PI: Principal Investigator

PRIMR: Public Responsibility in Medicine and Research

POI: Payload Operations Integration

POIWG: Payload Operations Integration Working Group

PTSD: Post-Traumatic Stress Disorder

R

RNI: Reports of New Information

RSA: Russian Space Agency

S

SAE: SAE International

SCAR: Scientific Committee on Antarctic Research

SCLT: Systems Capability Leadership Team

SEGs: Similar Exposure Groups

SMAC: Spacecraft Maximum Allowable Concentration

SME: Subject Matter Expert

SOFCOM: Special Operations Forces Command

SOH: Safety and Occupational Health

SOMD: Space Operations Mission Directorate

SOP: Standard Operating Procedures

T

TAMU: Texas A&M University

TEMPO: Tropospheric Emissions: Monitoring Pollution

TIM: Technical Interchange Meeting

TROPOZ: Tropospheric Ozone Lidar System Outdoor Laser and Stratospheric Ozone

U

UN: United Nations

USAF: United States Air Force

USDA: United States Department of Agriculture

UTMB: University of Texas Medical Branch

W

WHO: World Health Organization



Astronaut Serena Auñón-Chancellor examines her eye with a fundoscope aboard the International Space Station with remote support from doctors on the ground.



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