FAA | AST Commercial Space Transportation

COMSTAC

Morning
September 16, 2024

Federal Aviation Administration

Morning Agenda

9:00 – 9:30:	**Welcome Remarks:**
	Designated Federal Officer (DFO), Brian Verna
	COMSTAC Chair, Karina Drees
	COMSTAC Vice-Chair, Mike French
	Associate Administrator,
	Office of Commercial Space Transportation
	Mr. Kelvin B. Coleman
9:30 – 10:00:	ASTM F-47 Standards Briefing, Andrew Nelson
10:00 – 12:00:	**COMSTAC discussion on taskings**
12:00 – 1:15:	**L U N C H B R E A K**

Brian Verna

Designated Federal Officer (DFO)

COMSTAC

Karina Drees

COMSTAC Chair

Mike French

COMSTAC Vice-Chair

Kelvin B. Coleman

Associate Administrator,
Office of Commercial Space Transportation

Andrew Nelson

ASTM F-47 Standards Briefing

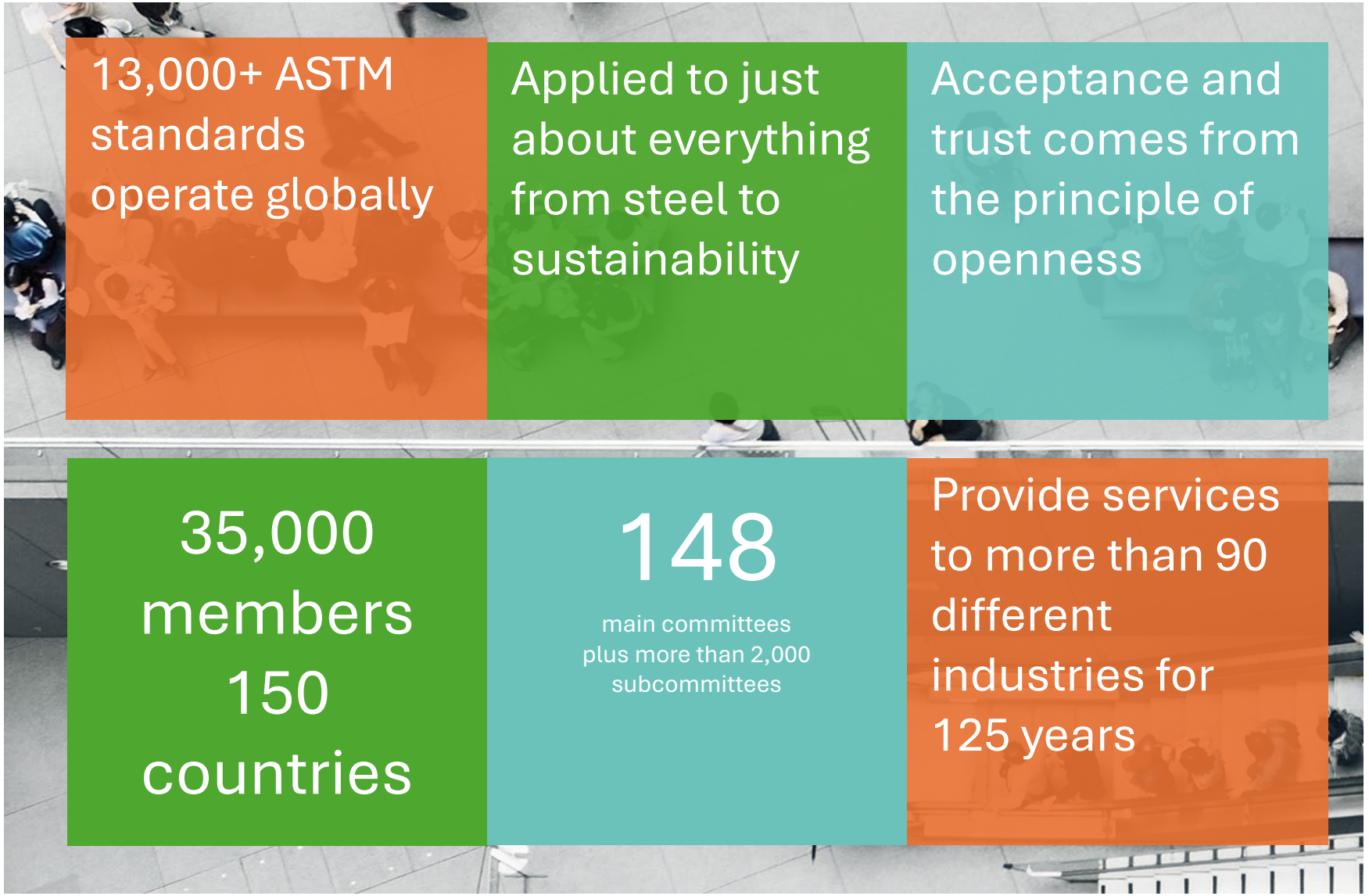
ASTM INTERNATIONAL
Helping our world work better

ASTM Committee F47 on Commercial Spaceflight

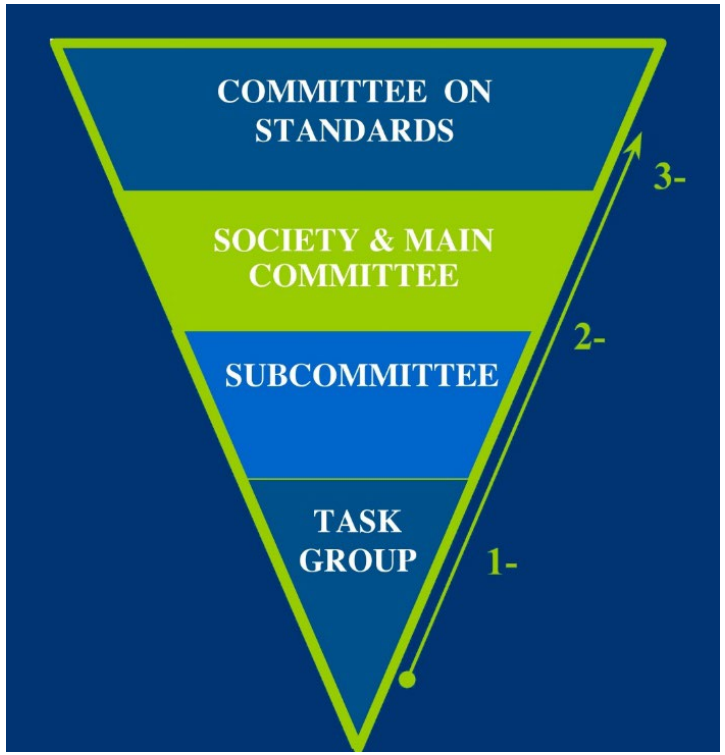
16 September 2024

www.astm.org

ASTM International

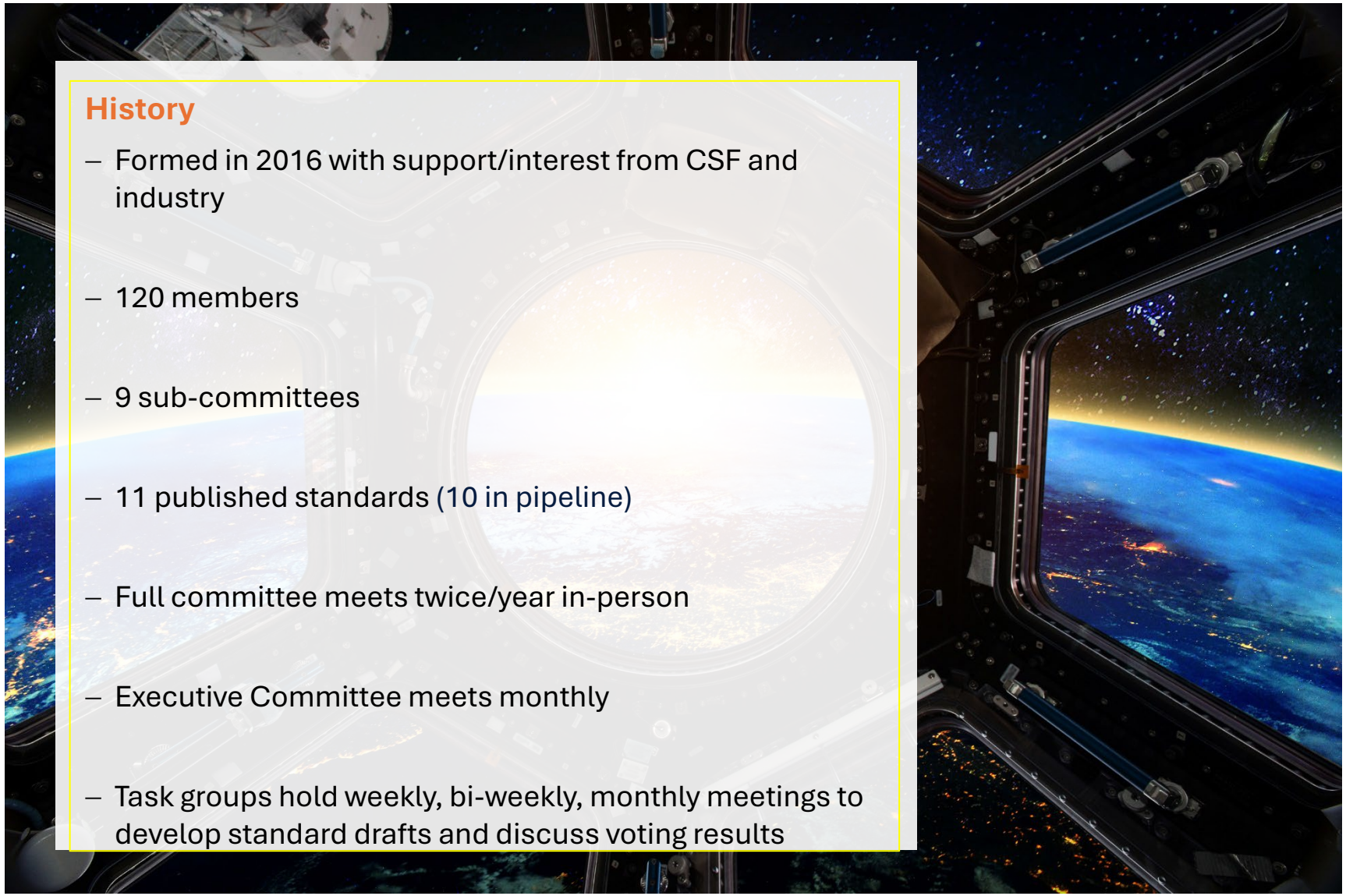


ASTM International Process



- ASTM is a neutral party that provides services to industry
- Volunteer members join and write standards
- Consensus process has checks and balances built-in to ensure balance
  - All members are classified (e.g., users, producers, etc.) and assigned voting rights (one per company or entity)
  - All voices are equal due to resolution requirements One dissenting vote stops the process until resolved
- All standards go through a rigorous balloting process until consensus is reached
- Standards are published

Committee F47 on Commercial Spaceflight



History

- Formed in 2016 with support/interest from CSF and industry
- 120 members
- 9 sub-committees
- 11 published standards (10 in pipeline)
- Full committee meets twice/year in-person
- Executive Committee meets monthly
- Task groups hold weekly, bi-weekly, monthly meetings to develop standard drafts and discuss voting results

Stakeholders Represented

Participation

- Vehicle operators, space habitat providers, and parts manufacturers
  - E.g., Boeing, SpaceX, Sierra Space, Blue Origin, Virgin Galactic, Axiom Space, Westinghouse, Disney, LMCO, Vast Space, Northrop, Aerospace Corp, MITRE

- Regulators / Other USG users & advisory groups
  - E.g., FAA/AST, FAA's COMSTAC, NASA, NOAA, DOC/OST, NIST, FAA (other business lines), DOE, DOD, EPA

- National Air Space (NAS) users

- Spaceport operators
  - Wallops, KSC/CCSFS, Spaceport America, Houston, Mojave

- Medical professionals

- Other interested stakeholders
  - CSF, ALPA, ASMA, NATCA

F47 Coordination with FAA/NASA/DOC

- **Federal Agency Coordination – TOP PRIORITY**
  - **FAA:**
    - Standards as an alternative means of compliance
    - FAA's recommended practices for human spaceflight were used as a road mapping tool
    - Continued coordination with AST
  - **NASA**:
    - Standards mapping efforts
    - Coordination with technical management
    - Active participation of technical staff to working groups
  - **DOC:**
    - Active staff participation
  - **US Coast Guard:**
    - Outreach and education – invitation for specific efforts
  - **US Space Force**

Current Status

Ongoing Committee Operations & Work Program Focus

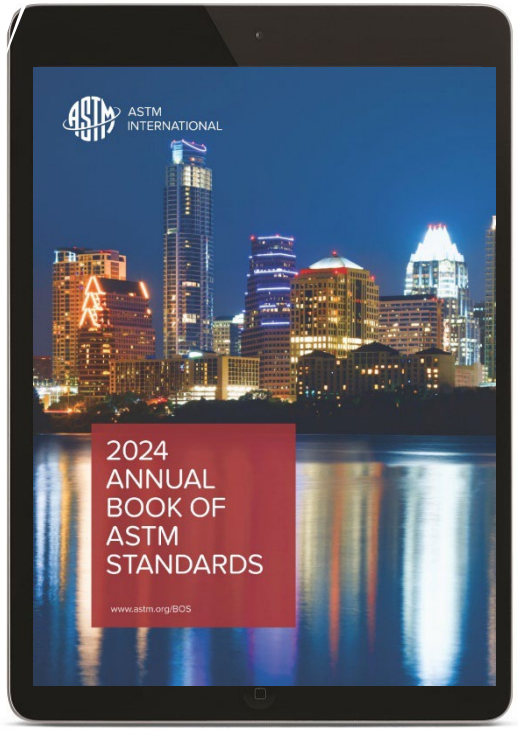
- Updated Officer Cadre / Executive Committee

- Strategic Road Mapping Priorities under Biennial Review

- Reestablished Subcommittee *F47.02 – Unoccupied Orbital Vehicles and Operations*
  - ✓Space Vehicles, ISAM, Operations, etc.

- Continuing prior work programs
  - ✓Means of Compliance (14 CFR 450 & 420)
  - ✓Human Space Flight + Medical Standards
  - ✓Voluntary Safety Reporting
  - ✓Space Nuclear Power

Published Standards



11 Published Standards (Volume 15.09)

- F3344-19 Standard Guide for Storage, Use, and Handling of Liquid Rocket Propellants
- F3377-23 Standard Terminology Relating to Commercial Spaceflight
- F3388-23 Standard Classification for Space Launch and Reentry Vehicles
- F3479-20 Specification for Failure Tolerance for Occupant Safety of Suborbital Vehicles
- F3514-21 Guide for Space Data Exchange to Support the Integration of Space Operations into Air Traffic Management
- F3520-21 Standard Guide for Training and Qualification of Safety-Critical Space Operations Personnel

- F3550-22 Standard Guide for Classifying Safety-Related Events
- F3568-23 Standard Guide for Medical Qualifications for Suborbital Vehicle Passengers
- F3610-23 Standard Classification for Descriptions of Spaceport Capabilities
- F3658-24 Standard Guide for Crewed Suborbital Space Vehicle Design
- F3668/F3668M-23 Standard Guide for Occupant Survivability in Orbital Vehicles

Standards Development Pipeline

10 Standards Currently in Development (dynamic)

WK Item #	Standard Title	Sub-Committee	Technical Contact
WK73835	Standard Guide for Spaceflight Participant Safety and Emergency Training	01	In transition
WK76298	Standard Test Method for Software Safety Standard	01	Blue Origin
WK88055	Standard Guide for Medical Qualifications for Orbital Vehicle Passengers	01	Axiom Space
WK89220	Standard Guide for Emergency Response Plan for Spaceports	04	RS&H
WK84313	Standard Practice for Human Factors in Commercial Spaceflight	05	Lockheed Martin
WK85993	Standard Test Method for Measuring the Insulation and Contact Temperatures Change of an Instrumented Hand in Glove Assemblies worn on Extravehicular Activities	05	NASA
WK85994	Standard Guide for Evaluating Impact Abrasion Resistance of Textile Fabrics Used in Spacesuits and Spacesuit Gloves (Rotary Tumbler Method)	05	NASA/Glove Manufacturer
WK85995	Standard Test Method for Measuring Cut Resistance of Materials Used in Spacesuits and Spacesuit Gloves Under Cryogenic Conditions with Tomodynamometer Test Equipment	05	NASA/Glove Manufacturer
WK86387	Standard Practice for Safe Operating Practices In-Space for Space Fission Reactors Used for Nuclear Power and Propulsion	05	NASA
WK87972	Standard Guide for Industry Requirements for Voluntary Spaceflight Safety Information Sharing Processes (VSS-ISP)	05	Interflight Global/Boeing

Lunar Space Glove Stds

Prioritized Future Work (dynamic)

Topic Area	Standard Title	Description	Sub committee	Currrent Priority
Orbital	Orbital Space Vehicle Design Guide	Provides comprehensive guidelines for the development and construction of orbital spacecraft. Potentially would combine and replace the Suborbital standard if it could cover suborbital, orbital, space station designs. A prototype standard document has been prepared for the design of suborbital space vehicles, orbital space vehicles, and orbital platforms (space stations). The requirements from the FAA Recommended Practices for Human Space Flight Occupants Safety, Version 2 dated September 2023 are included in this practice as well as information taken from other FAA and NASA documents.	F47.02	High
Ops	Flight Operations	Standards or best practices for operations (e.g., mission planning, execution, and coordination activity). Includes flight and ground ops, procedures, preflight and post-flight checklists, cargo, communications, interact w/ ground crew, & crew decision authority,	F47.03	High
Ops	Update to Data Exchange Guidance with FAA for ATM	Update to recently approved guidance document on data exchange with FAA for ATM to include additional data details and to address additional items such as cybersecurity.	F47.05	High
Orbital+	Fault Tolerance (FT) and Reliability Guide for Human Rated Spacecraft	How much redundancy/FT should a human rated spacecraft have? Is this different for LEO vs. cis Lunar? Which systems should have multiple layers of FT? Should the FT be increased when others are involved such as rendezvous or operations while docked to a space station? How reliable should space components be? Does a low reliability component affect the FT of the system? Do we define critical systems and then prescribe FT and reliability of each component, or do we look at the reliability of the whole system?	F47.01	High
Orbital	Orbital debris / end of life decommissioning activity	Addresses the management of orbital debris and end-of-life decommissioning of spacecraft through specific standards. These guidelines ensure responsible decommissioning practices to minimize space debris, promote sustainable use of orbital environments, and protect active space missions from potential hazards caused by defunct satellites and other debris	F47.02	High
Design and Test	Standards for Payload to launch/reentry vehicle interfaces	Mechanical and electrical interface standards such as marrying the payload to the launch vehicle or having a standard sizes of bolts or holes to ensure parts fit easily and interchangeably. Electrical standards for used in payloads such as connectors, electrical protection (voltage, current, surge/transient), and electrical interference to ensure that payloads could be used on as many vehicles as possible. This standard focuses on the interface between launch/reentry vehicles and the payload they are carrying.	F47.03	High
Ops	Standards for Maintenance of RLVs	In the United States, commercial spaceflight regulations currently do not address the maintenance of a reusable launch vehicle (RLV). In order to maintain public safety and safety of those inside the vehicle, the industry should coordinate a standard for RLV maintenance. Aligning with current standard work, this standard would provide guidelines and/or items to consider when performing RLV maintenance. The standard would not provide prescriptive actions for an operator to complete. Guidelines for RLV maintenance could include the following: (1) identifying components that require inspection/replacement after each flight cycle, (2) identifying components that can go multiple flight cycles prior to inspection/replacement, (3) what inspections/replacements to consider during operational readiness, (4) what inspections/replacements to consider post-flight, and (5) identify integrity or performance standard components that require inspection/replacement after each flight cycle. This would drive an operator to either (1) standardize their current maintenance process, (2) formalize a word-of-mouth maintenance process, or (3) start considering a maintenance plan for an upcoming vehicle. This may leverage comparable documents such as AC 43.13-1B - Acceptable Methods, Techniques, and Practices - Aircraft Inspection and Repair.	F47.03	High

Committee F47 Priorities

- Goal is safe launch, reentry and space missions with data driven shared best practices for learned improvements and innovation

- Continuous coordination with the FAA (and others like NASA, DOD, and Industry) for …
  - Future updated commercial spaceflight regulations,
  - SPaRC working groups, and
  - Advisory Circulars and commercial standards as alternative means of compliance with such regulations

- Develop and promulgate commercial spaceflight safety, operational, and technical standards

- Share best practices and consensus guides with Stakeholders
  - Industry, academia, other standards organizations, Congress, and
  - Executive Branch and its departments / entities such as NASA, DOC, DOS and DOD

ASTM International Staff Contacts

COMMITTEE POINTS OF CONTACT

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Report to COMSTAC

Innovation & Infrastructure and Research & Development Working Groups

September 16, 2024

Agenda

- Task Assignment
- Background
- Example of Recent Developments
- Observations
- Recommendations

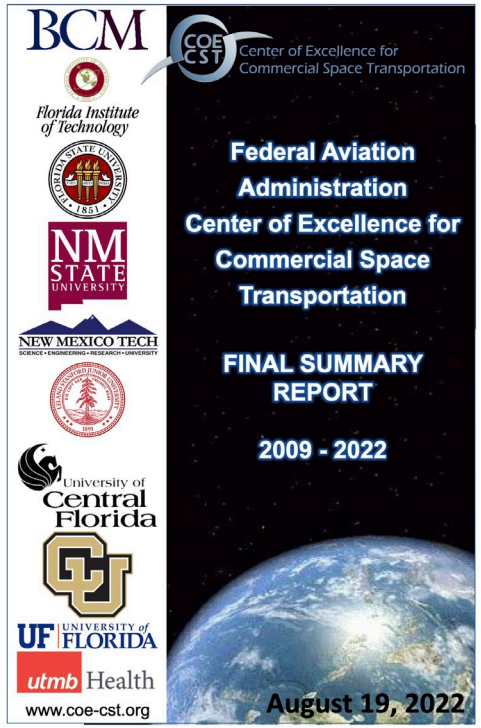

Task
Assignment

Task: Commercial Space Transportation Research Alliance

- Research options on Commercial Space Transportation standing up a Research Alliance made up of government, industry, and academia to foster research and development. This would be a follow-up to the Commercial Space Transportation Center of Excellence and provide a recommended path to implementation that includes potential funding, structure, and governance.

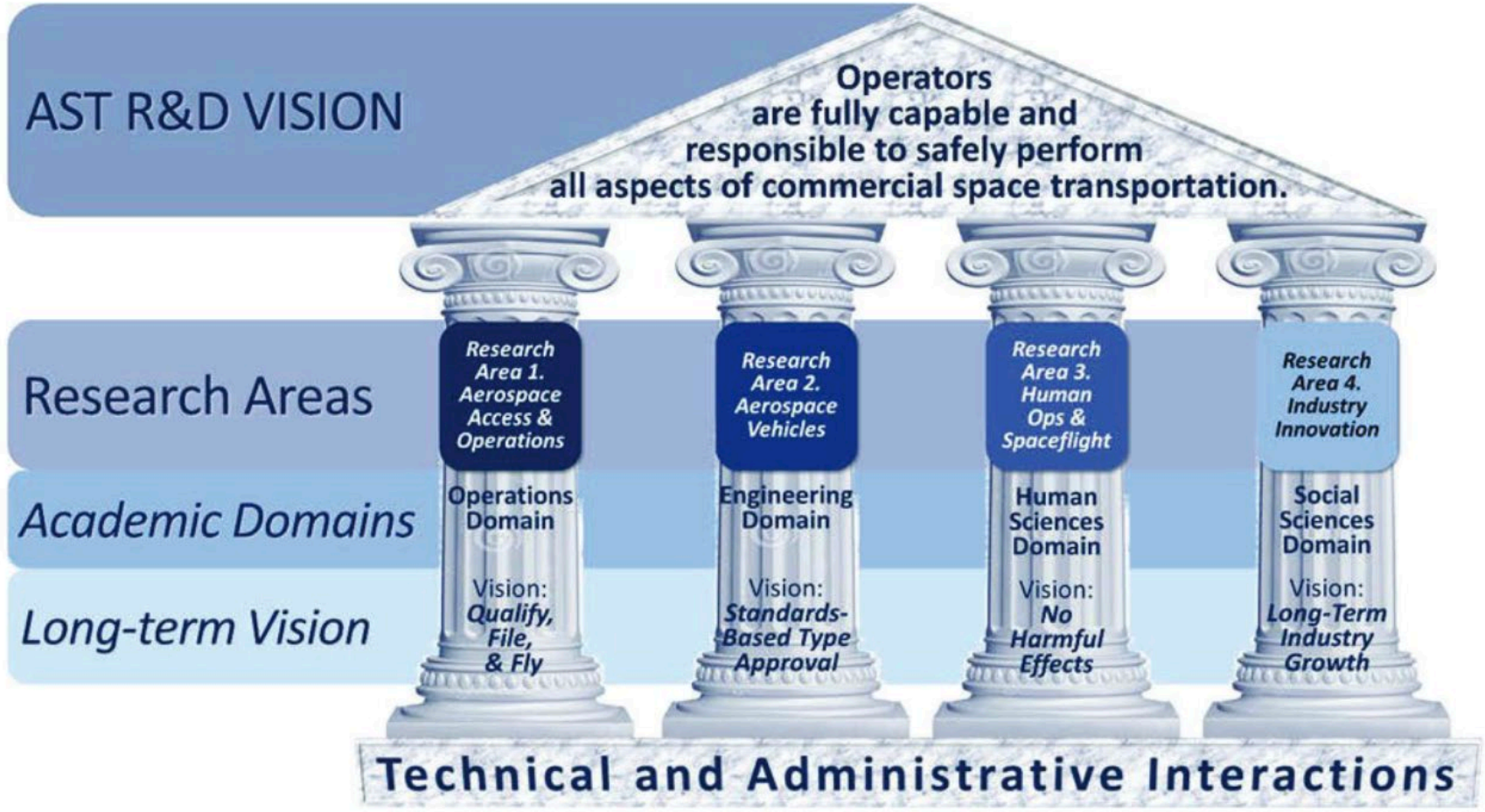
Background

FAA Center of Excellence for Commercial Space Transportation



- Established in 2010
- Involved 10 member universities and 36 industry partners
- Funded at approximately $1M per year for 10 years, with requirement for 1:1 match for all federal dollars spent
- Ended in 2022, after reaching the end of its planned lifetime, but with no replacement in place to allow academia to engage in commercial space transportation research

COE Research Areas



Original Recommendation

- The Secretary of Transportation should competitively award a cooperative agreement to a university, nonprofit, or not-for-profit organization to establish a consortium that would operate a Commercial Spaceflight Research Alliance.
- The cooperative agreement should be awarded for a period of 10 years.
- An appropriate initial value of the award would be $30M per year.

Questions from the April Meeting

- Why does this need to be a nonprofit?
- Why does this need to be tied to DOT if it is a 501(c)(3)?
- Wouldn’t NASA or DOC be better choices for this than DOT?
- Who would populate the group and where would the expertise come from?
- How do we transition the research to industry?
- Are we putting the cart before the horse?

Why a Nonprofit?

Several options are available for governance:

- Ad Hoc Research (Status Quo)
- Government Program
- Public/Private Partnership Program
- Non-Government, Nonprofit Program

Any of these approaches COULD be used, but a Non-Government, Nonprofit Program has the potential to be faster, more innovative, less costly, more inclusive, and more collaborative than other options.

If Nonprofit, Why the Need to Tie to DOT?

- Even if a nonprofit, non-governmental entity is responsible for managing the operation of the research alliance, the government needs to be part of the effort somehow, if we want it to be fully successful.
- Why should DOT be one of the agencies involved?

  Title 51, U.S. Code § 50901, states that:

  "A critical area of responsibility for the Department of Transportation is to regulate operations and safety of the emerging commercial human space flight industry."

Wouldn’t NASA or DOC Be Better Choices for This than DOT?

Perhaps they would be. However:

- Neither NASA nor DOC have taken any action to create a Commercial Spaceflight Research Alliance.
- The best approach would be to have a collaborative research alliance that involves DOT, NASA, and DOC, as well as other government agencies, in addition to industry and academia.

Who Would Populate the Group and Where Would the Expertise Come From?

- The program would be a collaborative effort involving all interested parties from Government, Industry, Academia, and International Partners.
- Participants would include scientists, engineers, technicians, astronauts, physicians, researchers, flight controllers, flight planners, policy experts, and market analysts, depending on the specific research topic.

How Does the Research Get Transitioned to Industry?

- Industry would be encouraged to participate in the program, both in identifying research needs, and in performing the needed research.
- Regular conferences and workshops would be held to share research results.
- Written reports would be used to document observations, findings, and recommendations.

Are We Putting the Cart Before the Horse?

Not anymore!

- Recent developments make it possible to proceed with implementation immediately.
- Specifically, a non-government, nonprofit organization has now been formed with the primary purpose of operating a Commercial Spaceflight Research Alliance.

Example of Recent Developments: Establishment of the HRP-C

The Human Research Program for Civilian Spaceflight

HRP-C Mission

The Human Research Program for Civilian Spaceflight is concerned with creating a safe and healthy environment for civilians to live and work in space.

HRP-C Vision

Our vision is to foster a collaborative ecosystem where partners join forces to advance space exploration and habitation. Together, we focus on critical areas such as space health monitoring, biorepository research, risk assessment, and leveraging AI for predictive modeling. We prioritize precision medicine, uphold ethical standards through our IRB (institutional review board), and empower physicians with continuing education. With a commitment to civilian training and developing effective countermeasures, we bridge space and Earth through our terrestrial applications program. Through meticulous preparation and a focus on food, nutrition, and metabolism, we pave the way for safe and sustainable human presence beyond our planet.

HRP-C
The Human Research Program for Civilian Spaceflight

HRP-C Implementation

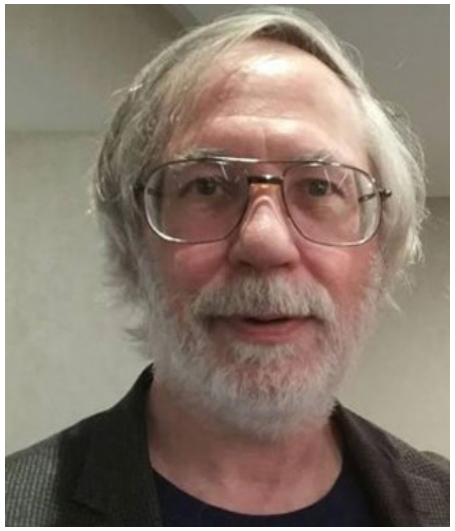
- The Human Research Program for Civilian Spaceflight (HRP-C) has been incorporated as a nonprofit, Non-Governmental Organization [501(c)(3)] in the Commonwealth of Virginia.
- HRP-C Basic Principles:
  - All interested parties from government, industry, and academia are welcome (and encouraged) to participate.
  - Focused on research and data sharing, not regulations.
  - Collaborative in nature.
  - International in scope.

HRP-C
The Human Research Program for Civilian Spaceflight

HPR-C Founders & Directors

Dr. Michael A Schmidt
CEO
Sovaris Aerospace

Dr. Michael Marge
Former Dean and Professor
Syracuse University



Dr. Mark Shelhamer
Former Chief Scientist
NASA Human Research Program

Dr. George Nield
President
Commercial Space Technologies, LLC

Mary Cull
Former Special Advisor
Office of Space Commerce

Workshop on the Human Research Program for Civilians in Spaceflight and Space Habitation

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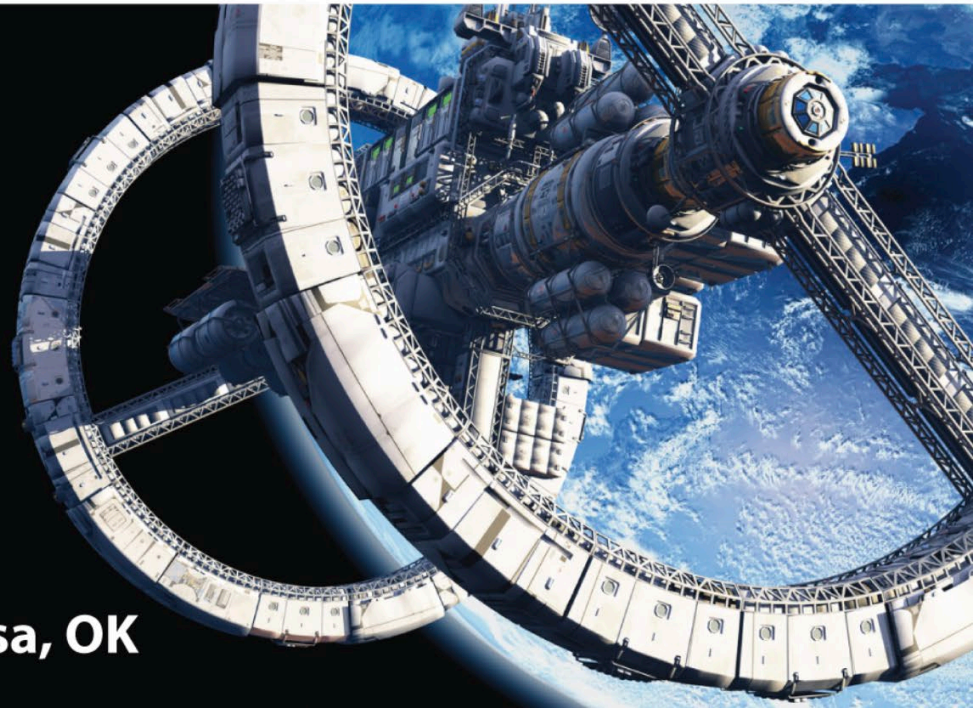


January 23 – 24, 2024, Tulsa, OK

HRP-C
The Human Research Program for Civilian Spaceflight

Organizations Participating in Workshop - Universities

- Oklahoma State University
- Baylor College of Medicine
- University of Louisville
- Johns Hopkins University
- St Mary's University
- University of Texas Medical Branch
- University of Teramo
- University of Michigan
- Bowling Green State University
- University of Minnesota
- Weill Cornell Medicine
- Virginia Tech
- Stanford University
- University of Oxford
- Oita University
- Trident Technical College
- Embry-Riddle Aeronautical University
- Matsumoto University
- University of North Dakota
- Augsburg University
- University of the Philippines
- University of Massachusetts
- Cardiff University
- Universidad Nacional de Colombia
- King's College London
- Mayo Clinic
- Rice University
- SDA Bocconi School of Management
- University of California San Diego
- Harvard University
- Nihon University School of Medicine
- Buffalo State University
- Florida Institute of Technology
- University of Pennsylvania

HRP-C
The Human Research Program for Civilian Spaceflight

Organizations Participating in Workshop – Government Agencies

- National Aeronautics and Space Administration (NASA)
- European Space Agency (ESA)
- Japan Aerospace Exploration Agency (JAXA)
- German Aerospace Center (DLR)
- Brazilian Space Agency (AEB)
- National Space Research and Development Agency (NASRDA - Nigeria)
- Federal Aviation Administration (FAA)
- U.S. Air Force (USAF)
- Department of Health and Human Services (HHS)
- National Cancer Institute (NCI)
- National Institutes of Health (NIH)
- U.S. House of Representatives
- U.S. House Committee on Science, Space, and Technology (staff)
- U.S. Senate (staff)

HRP-C
The Human Research Program for Civilian Spaceflight

Organizations Participating in Workshop – Industry

- SpaceX
- Boeing
- Virgin Galactic
- Blue Origin
- Sierra Space
- Aerojet
- Redwire
- Space Tango
- Astro Access
- The NASTAR Center
- OrbitalMed Inc.
- KBR
- All Points
- Translational Research Institute for Space Health (TRISH)
- 3M Health Care
- InterFlight Global Corporation
- Blue Abyss
- Explore Mars, Inc.
- Sovaris Aerospace
- Physical Mind London
- Beyond Earth Institute
- Atento Capital
- Institute of Space Commerce
- Institute of Biomedical Problems of the Russian Academy of Science (IBMP)
- SCOUT Space Inc.
- Space Studies Institute
- Star Harbor

HRP-C
The Human Research Program for Civilian Spaceflight

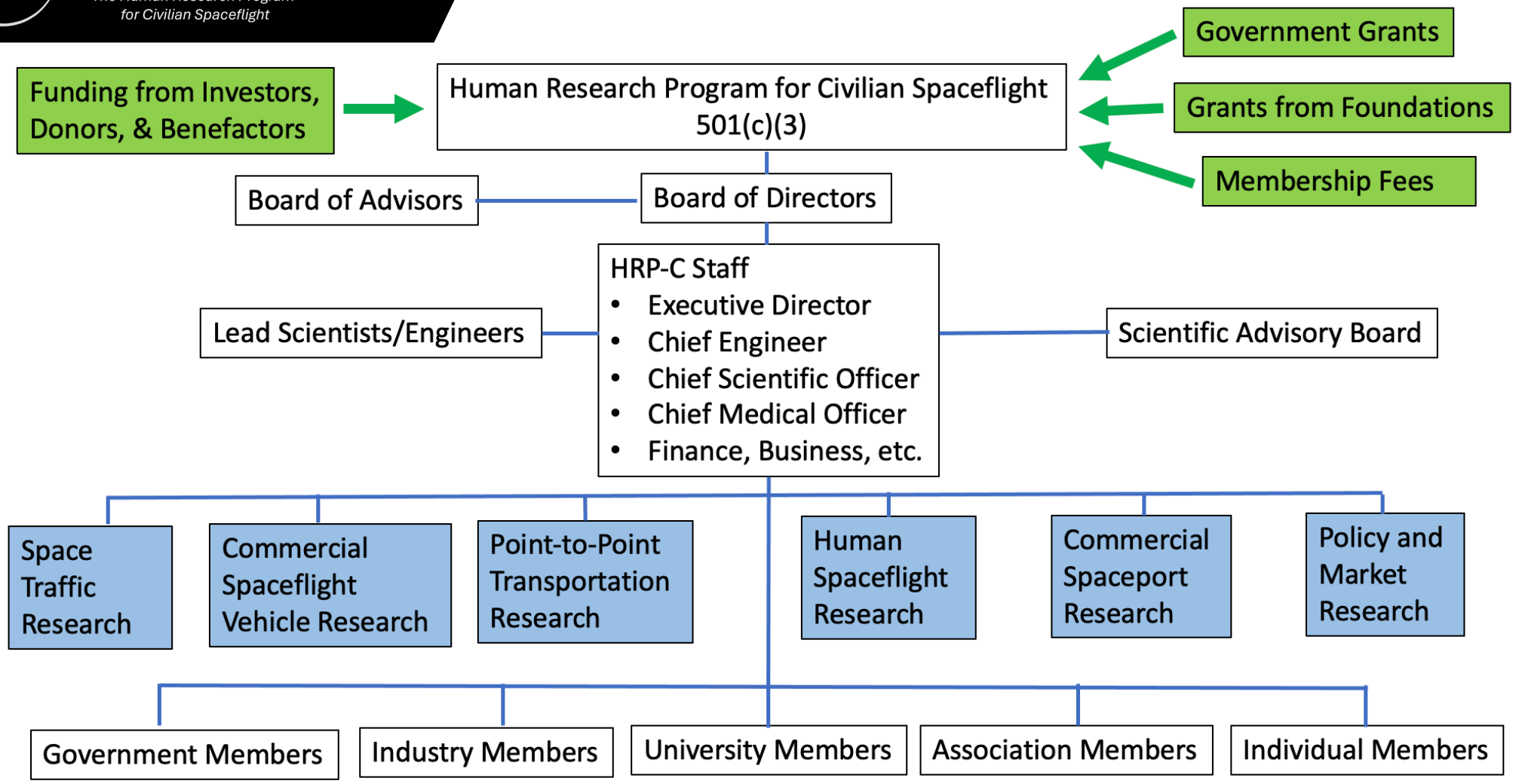
Organizations Participating in Workshop – FFRDCs & Other Groups

- The Aerospace Corporation
- The MITRE Corporation
- RAND Corporation

- Space Foundation
- International Association for the Advancement of Space Safety
- Satcom Industry Association
- Global Spaceport Alliance
- Oklahoma Air & Space Port
- Space Port Australia
- Aviation Week

HRP-C

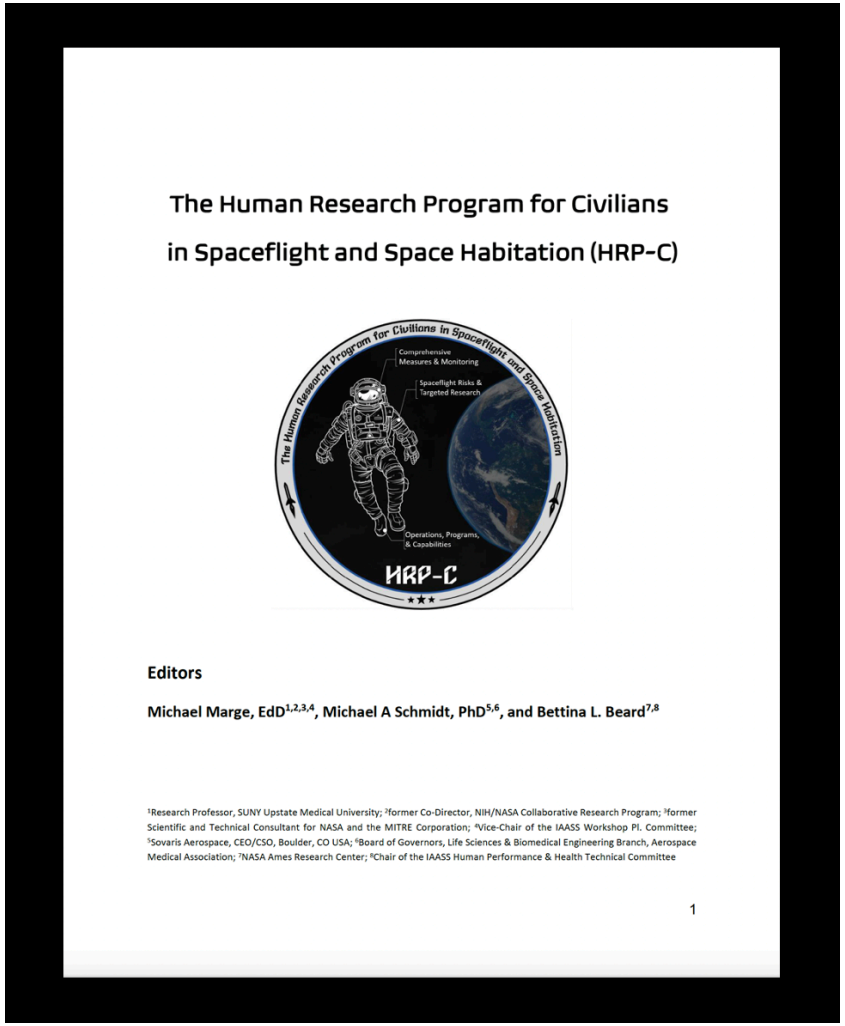
The Human Research Program for Civilian Spaceflight



HRP-C
The Human Research Program for Civilian Spaceflight

Human Research Program for Civilians in Spaceflight and Space Habitation (HRP-C)

The detailed research program description is available on the HRP-C website: https://hrp-c.org/



The Human Research Program for Civilians in Spaceflight and Space Habitation (HRP-C)

Editors

Michael Marge, EdD[1,2,3,4], Michael A Schmidt, PhD[5,6], and Bettina L. Beard[7,8]

[1]Research Professor, SUNY Upstate Medical University; [2]former Co-Director, NIH/NASA Collaborative Research Program; [3]former Scientific and Technical Consultant for NASA and the MITRE Corporation; [4]Vice-Chair of the IAASS Workshop PI. Committee; [5]Sovaris Aerospace, CEO/CSO, Boulder, CO USA; [6]Board of Governors, Life Sciences & Biomedical Engineering Branch, Aerospace Medical Association; [7]NASA Ames Research Center; [8]Chair of the IAASS Human Performance & Health Technical Committee

1

Research Tracks

Track 1: Comprehensive Measures & Monitoring
Track 2: Spaceflight Risks & Targeted Research
Track 3: Operations, Programs, & Capabilities
Track 4: Complementary Technologies & Research

Track 1: Comprehensive Measures & Monitoring

- Molecular Phenotyping
- Physiological Phenotyping
- Behavioral Phenotyping
- Morphological Phenotyping
- Environmental Phenotyping

HRP-C
The Human Research Program for Civilian Spaceflight

Track 2: Spaceflight Risks & Targeted Research

- Altered gravity, gravity transitions, and transient high g impact on health status of a large, diverse population of civilian space travelers
- Space-encountered radiation impact on the physiology, psychology, and behavior of civilian travelers
- Impact of spaceflight on individuals with implanted medical devices and prostheses
- Isolation, confinement, and distance from Earth effects on the psychology and function of civilian travelers
- Insufficient pre-flight familiarization, training, and medical preparation/logistics for anomaly response
- Impact of spaceflight on civilian travelers from diverse populations with chronic health conditions
- Impact of environmental exposures (e.g., dust, elevated CO2, etc.) on the physiology and behavior of civilian space travelers on the Physiology, Psychology, and Behavior of space travelers

Track 3: Operations, Programs, & Capabilities

- Artificial Intelligence, Predictive Modeling, and Digital Twins
- Civilian Training
- Continuing Medical Education
- Countermeasure Development
- Ethics and Rights
- Exercise and Musculoskeletal Loading
- Food and Nutrition
- Gender-Specific Applications
- Human Spaceflight Data Repository
- Human Specimen Biorepository
- Human Systems Integration
- Human System Risk Board for Civilians (HSRB-C)
- IRB for Civilian Spaceflight (IRB-C)
- Precision Medicine
- Preparation and Contingencies
- Regenerative Medicine
- Space Health Reporting System (SHRS)
- Terrestrial Applications of Space Research

Track 4: Potential Complementary Technologies & Research Topics

- Commercial Spaceflight Vehicle Design
- Commercial Spaceflight Vehicle Operations
- Environmental Control & Life Support Systems
- Space Sustainability
- On-orbit Data Sharing
- Debris Mitigation Measures
- Point-to-Point Transportation through Space
- Commercial Spaceport Research
- Workforce Development
- Commercial Spaceflight Policy
- Commercial Spaceflight Market Research

Feedback from NASA

"The mission of HRP-C™ to create a safe and healthy environment for civilians of all abilities to live and work in space is both inspiring and essential to the future commercial endeavors and the safety of future private citizens flying in space. We commend the efforts of the distinguished group of international experts who have been working since 2020 to develop this comprehensive research program."

"NASA recognizes the importance of fostering a strong collaborative environment with leading space research organizations, institutes, and centers. We are eager to contribute our expertise and resources to support the four key research tracks outlined by HRP-C™ and have a wealth of knowledge on human system risk, space medicine, and space physiology that we can share."

- Senior NASA Executive


Observations

Observations

- Given the rapid pace of activity, there is an urgent need (and opportunity) for government, industry, and academia to collaborate in performing research through a Commercial Spaceflight Research Alliance.
- A nonprofit organization (HRP-C) has now been established in order to meet that need.

Recommendations

Recommendation 1

- The Office of Commercial Space Transportation should engage with nonprofit organizations like HRP-C on a regular basis, to share research needs and priorities and to receive status updates on research accomplishments.
- To ensure project oversight and appropriate involvement, an FAA representative could serve as a Member of the HRP-C Board of Advisors or participate on an ad hoc basis.

Recommendation 2

- The Office of Commercial Space Transportation should request increased funding for commercial space transportation research activities, while ensuring that it has the resources needed for both licensing and safety inspections.
- As research funding becomes available, the Office of Commercial Space Transportation should consider providing research grants to HRP-C to address its high-priority research needs.

Recommendation 3

- Given that a nonprofit organization (HRP-C) has already been established, this research initiative should begin immediately.


Questions?

Report to COMSTAC

Task 2

Task 2: Strategic views on improving AST workforce pipelines and maintaining employees' technical knowledge base.

- What are COMSTAC's out of the box ideas on how to strengthen AST's workforce pipelines. As technology continues to evolve, what does COMSTAC recommend FAA do to help maintain employee familiarization and currency with the innovative commercial space transportation industry.

Task 2 Background

- The commercial space launch cadence continues to increase and the Federal government plays an increasingly important role in ensuring that regulatory processes support the pace of industry.

- Effective regulatory practices are dependent on a strong, capable workforce.

- COMSTAC was tasked with providing recommendations on strengthening AST's hiring practices as well as maintaining current employees' technical knowledge by providing out of the box ideas on how to strengthen AST's workforce pipelines.

Task 2 Observations

- COMSTAC members have experienced the importance of having knowledgeable, competent staff within FAA AST.
- Growing and retaining the workforce is essential to maintaining sound licensing practices.
- AST employees must to meet with key people at all levels of the commercial space industry.
- Commercial space launch and reentry operators and commercial spaceports often have low visibility into the AST environment.

Recommendation 1:
More direct AST employee engagement with industry.

- Develop an “Education with Industry” rotation program that would allow selected individuals to be assigned to and work for an aerospace company for several months.

- Provide a travel budget for employees to travel to and conduct more on-site meetings with operators.

- Send key employees to lunch and learn events with operators and industry associations.

Recommendation 2:
Enhance employee engagement within AST.

- Develop employee rotation programs for new employees that would allow them to work in several different parts of AST after being hired.
- Empower employees to be involved in decisions.
- Create a more inclusive atmosphere where employees feel they are part of the solution to regulatory concerns.
- Establish on-boarding / annual training programs to assist new AST employees with understanding the rationale and intent of licensing.
- Inspire employees to have more influence over their career paths.
- Support AST employee engagement with research activities, such as the recommended initiative for a Commercial Spaceflight Research Alliance.

Recommendation 3:
Increase involvement with conferences to improve employees' knowledge base and inspire networking

- AST should be sending employees to commercial space conferences, such as AIAA Ascend, Space Symposium, and SpaceCom.

- Encourage AST employees to become members of and regularly participate in professional societies, such as the AIAA.

Recommendation 4:
Improve partnerships with Universities, Associations and Fellowship Programs

- Establish formal relationships with trusted universities to provide a guaranteed number of open positions and expedited hiring authorities.
- Significantly increase the internship program as a way of starting the recruiting process before graduation.
- Partner with industry groups or associations to support activities for aerospace students.
- Partner with local universities to offer on-site technical and other courses or degree programs.
- Commit to regularly sending employees to the International Space University summer session programs.

FAA | AST Commercial Space Transportation

LUNCH BREAK

We will return at 1:00 PM ET

https://www.youtube.com/live/iXdGPIg8aKQ

Federal Aviation Administration

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