MUREP Innovation and Technology Transfer Idea Competition

NASA MITTIC Challenge Guidelines Fall 2023/Spring 2024

NASA MITTIC Description

Your career pathway can start HERE, no matter your field of study! The NASA Minority University Research and Education Project (MUREP) Innovation and Tech Transfer Idea Competition (MITTIC) is seeking HBCU and MSI teams of students from *all fields of study* to rise to the challenge of creating new and innovative technologies to benefit your community and the world. MITTIC provides a resume worthy experience, an opportunity to gain or show off your entrepreneurial skills, money, and bragging rights for your school. This #SpaceToPitch is a chance to develop your own "spinoff" idea into a lucrative business opportunity in the future.

NASA MITTIC Competition Components

There are two opportunities to compete with NASA MITTIC during each academic year. Proposals are accepted in fall and spring semesters. Proposals are only accepted for the current semester.

Phase 1: Open Proposals

Teams of students choose one NASA intellectual property (IP) and use it to create a product or service with commercial applications. Teams submit a proposal explaining the idea or concept (see proposal requirements).

- Teams are encouraged to be multi-disciplinary. Ex: Engineering, Business, Natural Science, Communications, Mathematics, Aviation, etc.

Phase 2: Space Tank

Selected teams will compete in Space Tank at NASA's Johnson Space Center (JSC) in Houston, Texas. Travel and lodging for core team members and the primary principal investigator (PI) will be provided by NASA MITTIC.

- Selected teams will engage in online orientation as well as a virtual preliminary pitch review to assist the team in development of their final pitch prior to the on-site experience.
- Space Tank will include NASA facility tours, a poster session, networking activities with NASA employees and business partners, subject matter expert (SME) presentations, and will conclude with the pitch competition.
- Prize money will be awarded to teams who place first and second in each Space Tank competition. First-place earns **$20,000**. Second place earns **$10,000**. To qualify, winning teams must participate in all events and submit all deliverables. $2,500 of each first and second place prize is awarded directly to the PI as a stipend.

Phase 3: Ames Experience in Silicon Valley

The first-place team of the Space Tank Competition for both fall and spring competitions will visit and present to NASA's Ames Research Center (ARC) executives and various tech companies in Silicon Valley, California, in June 2024. This experience provides the team with an exclusive look at facilities, laboratories, and start-up companies; and it provides the opportunity to discuss further concept development. Travel and lodging for core team members and the primary PI will be provided by NASA MITTIC.

MITTIC Participation Benefits & Opportunities

Teams selected for Phase 2: Space Tank will have the opportunity to experience a variety of benefits. These benefits and opportunities will be available to teams during both fall and spring competitions.

Prize money!
$20,000 for placing 1st in Space Tank
$10,000 for placing 2nd in Space Tank
*$2,500 of each prize will serve as a stipend for the team PI

Core team members can apply to receive a paid NASA internship funded by MUREP
*Visit intern.nasa.gov for internship eligibility requirements

Exclusive tours of exciting NASA facilities such as Mission Control for the International Space Station and the Neutral Buoyancy Lab where astronauts train for space walks

Networking face-to-face with NASA and industry leaders in Houston and Silicon Valley to develop your professional network

Professional coaching from business experts on concept development and pitching techniques

Access for your institution to additional funding and research opportunities with NASA, other federal agencies, and industry partners

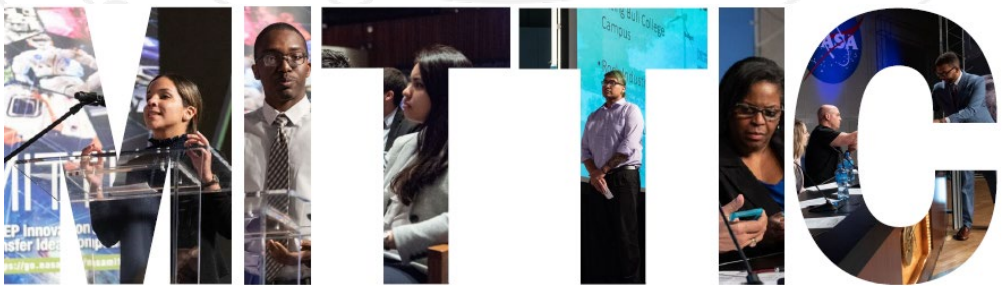
Eligibility and Collaboration Requirements

- All team members must be 18 or older and U.S. citizens.
- Each team must have three to six members that are full-time undergraduate or graduate students enrolled in an accredited U.S. institution of higher learning (junior college, community college, college, or university) at the time the proposal is submitted.
- At least 60% of the team must be enrolled at a Historically Black College and University (HBCU) or a Minority Serving Institution (MSI).
- Teams from MSIs that have been selected to complete in previous NASA MITTIC competitions, including MITTIC HBCU hackathons, must have at least 50% new core team members, a new IP, and a new concept/idea.
- Each team is required to have a primary principal investigator (PI) who actively works for the proposing MSI. A principal investigator could be a previous or current professor, a dean or department chair, or another faculty member and/or administrator.
- Teams may choose to combine with another MSI or a non-MSI. The "core team institution" is the MSI of which the primary PI is employed, meaning when the monetary incentive is given, it is given to that PI and/or institution. The PIs will decide on if they choose to split funds with other institutions on their team after the award is received (MITTIC will not be part of this process).
- Institutions can submit multiple proposals; however, a PI cannot sponsor more than 3 teams. Teams must have different student members and a different IP. An entire class of students can form multiple teams.

Submitting a Proposal

Interested teams who meet all eligibility requirements may submit a proposal using the "Apply Now" button on the NASA MITTTIC website during the submission time frames (see timeline).

Proposals will be reviewed and evaluated by a committee. In the event of a tie, priority is given to teams partnering with a large or small business.



NASA MITTIC Activity Calendar | 2023 to 2024

August
7 – Fall Proposal Window Opens

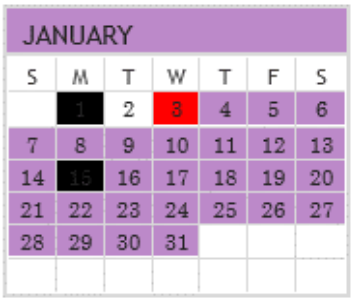
September
24-28 – HBCU Week

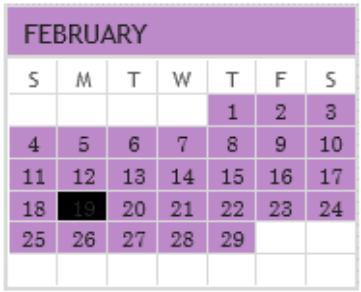
October
16 – Fall Proposal Window Closes
31 – Acceptance Letters to Selected Teams

November
8 – Virtual Orientation & On-Site Preview
15 – Preliminary Pitch Review (Virtual)
29-30 – JSC Fall Immersion Experience

December
1 – Fall Space Tank Competition

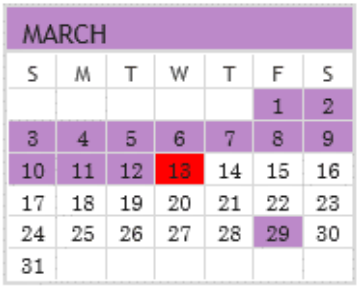
January
3 – Spring Proposal Window Opens

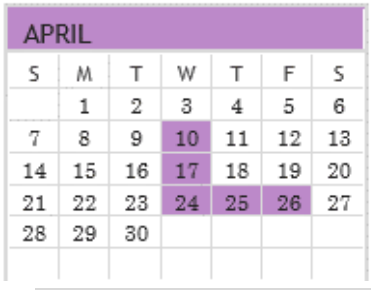




February

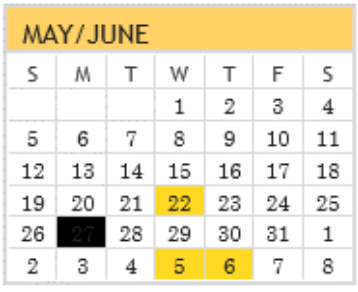
March
13 – Spring Proposal Window Closes
29 – Acceptance Letters Send to Teams





April
10 – Virtual Orientation & On-Site Preview
17 – Preliminary Pitch Review (Virtual)
24-25 – JSC Spring Immersion Experience
26 – Spring Space Tank Competition

May/June
May 22 – Virtual Ames Orientation Session
June 5-6 – Ames Immersion Experience for *both* Space Tank winning teams



Proposal Requirements

Team proposals must include: a 5-to-8-page technical paper, **and** a 3-to-5-minute lightning pitch highlighting their NASA spinoff concept. The cover, appendix, outreach, and use of funds pages, as well as certificates or documentation of learning tools or letters of support, do not count toward the page limit.

Technical Paper Rubric (70 points)

Element	Score
Concept Content ****Titled sections of the technical paper must match the element titles shown below.** **INNOVATION** ✓ A cutting edge or ground-breaking spinoff concept is detailed. ✓ A need for this commercialization is demonstrated. ✓ Explain how the concept has a competitive advantage to disrupt the current market. **COMMERCIALLY VIABLE** ✓ An effective business plan in included. ✓ Thorough research and market studies on the current market trends and potential customers is shown. ✓ A detailed marketing plan demonstrating an increase in commercial viability is included. **FEASIBLE** ✓ The plan describes details on how the concept would be produced. ✓ A diverse feasibility study is conducted. **EFFECTIVENESS OF THE PROPOSED WORK PLAN** ✓ A comprehensive work plan to create a prototype or to commercialize the concept is included. ✓ Documents proposed schedule of milestones for meeting objectives. **PRICE REASONABLENESS** ✓ Demonstrates that the concept is cost efficient and can produce a profit in the current market. ✓ A detailed budget is included to show profit margins and prove cost efficiency. **APPENDIX (if necessary)** ✓ Supplemental charts, graphs, citations, etc. can be included in this section and does NOT count toward the page limit	12 points each for 5 elements 60 pts max
MITTIC-Specific Information **OUTREACH** ✓ A minimum of 2 public outreach events are planned to showcase your experience with MITTIC. ✓ Diverse audience is targeted for activities planned. ✓ Outreach page does not count toward the page limit. **USE OF FUNDS** ✓ Details on how the team will utilize any money, in the event they place first or second in the MITTIC Space Tank competition, are included. Some suggestions for using MITTIC funds include: a. b.	5 points each for 2 elements 10 pts max

c. Purchase of hardware and/or software to assist in product development. d. Upgrades to facilities or technology to assist with concept development. e. Business consultation fees. f. Fees associated with obtaining patents, trademarks, copyrights, or publishment. g. Team member travel (and expenses) to workshops, conferences, or trade shows. ✓ Use of funds page does not count toward the page limit. **OPTIONAL Letter of Support** ✓ If a team has obtained a letter of support from their institution or a business partner, it can be included with the technical paper ✓ Does not count toward the page limit **OPTIONAL Learning Tools** ✓ Certificate of completion from L'SPACE or other training course OR ✓ Documentation of participation in a MITTIC HBCU hackathon competition OR ✓ Proof of non-NASA concept to commercialization training ✓ Does not count toward the page limit	
Formatting Requirements MITTIC actively screens all concept papers and reserves the right to reject any paper that does not conform to the following formatting requirements. **TYPE AND PAGE SIZE** ✓ Type Size: No type size smaller than 10 points shall be used for text or tables, except as legends on reduced drawings. ✓ Page Size: Pages must be standard size (8.5 X 11 sheets). **HEADER AND FOOTER** ✓ The header must include the name created for your concept/team's name and full name of the NASA Intellectual Property used. Institution names should not be located anywhere on the document other than the cover sheet. The footer must include the page number. **COVER PAGE** **A.** Team Name **B.** MSI Name (if it is a combined team, list all institutions; MSIs first) **C.** NASA Intellectual Property Selected **D.** Team Member Information List core team member's information below. 1. First and Last Name 2. Email Address 3. Institution **E.** Principal Investigator/Co-principal Investigator (PI) Information (Lead PI must meet MITTIC eligibility requirements.) 1. First and Last Name 2. Email Address 3. Phone Number 4. Institution Employed By **F.** Partner Business Information (if applicable) 1. Large or Small Business Name 2. First and Last Name of Contact 3. Email Address 4. Phone Number **G.** Company Logo (Optional) ✓ Cover page does not count toward the page limit.	Pass/Fail

Lightning pitches are used to provide a visual method to share your research or ideas. It is recommended that teams reference the video, "How to Pitch Your Startup in 3 Minutes," when creating a lightning pitch for their proposal. This video, as well as other resources, can be found on the NASA MITTIC website.

Video Lightning Pitch Rubric (30 points)

Element	Score
LENGTH: Video must be 3-5 minutes.	6 points
STORY: Does the video provide a compelling narrative for why the proposed concept is valuable or relevant? Does it draw the audience in?	6 points max
PRESENTATION: Is the concept presented in a way that provides the overarching details of the concept without sounding like a technical presentation? Is the concept presented as innovative or cutting edge? Are presenters talking too fast or slow?	6 points max
PASSION & ENTHUSIASM: Does the video communicate passion and enthusiasm for the concept and/or mission of the business? Does it make you want to invest?	6 points max
TECHNICAL QUALITY: Is the audio clear and not sped up? Are there good transitions and overall cohesiveness between presenters and/or points of the presentation? Are images, slides, and presenters displayed clearly and professionally?	6 points max

Method of Selection and Evaluation Criteria

Proposals must provide all information needed to complete evaluation. NASA scientists, engineers, and industry experts evaluate proposals. Qualified experts outside of NASA may assist in evaluations as required to determine merit. NASA MITTIC intends to select proposals that offer the most advantageous commercialization potential. MITTIC gives primary consideration to the innovation, commercial viability, and feasibility of the concept and its benefits to NASA interests.

Deliverables for Selected NASA MITTIC Teams

Each selected team for Space Tank is required to meet the project milestones identified in the table below:

Team Introduction Video
Travel Survey
Poster Submission
Team Exit Video
Virtual Outreach Activity

Due dates are dependent upon which session (fall or spring) is active and are provided to each team upon notification of their selection for Space Tank.

Teams who place first in the Space Tank competition receive $20,000. Teams who place second receive $10,000. $2,500 of each first and second place prize is awarded directly to the PI as a stipend. The remaining award amounts are sent to the Minority Serving Institution of which the primary PI is employed at the conclusion of the competition.

Optional Learning Tools & Incentives

Through collaboration with NASA L'SPACE Academy, NASA MITTIC is offering a concept to commercialization training opportunity. The L'SPACE Proposal Writing and Evaluation Experience Academy is a free, online, interactive 12-week training course designed to provide unique, hands-on learning and insight into the dynamic world of the Space Industry. Other NASA-provided commercialization training opportunities, such as MITTIC HBCU hackathons, are available for students to gain experience that will assist in the development of their NASA MITTIC proposal. Additionally, students may seek other concept to commercialization trainings that are not sponsored by NASA.

Teams selected to compete with NASA MITTIC who include at least one Certificate of Completion from a L'SPACE Academy, or another NASA-sponsored training, will be awarded additional points towards the score of their proposal. Proof of participation in a MITTIC HBCU hackathon requires a 1-page summary with the following details:

1. Name of student participant(s)
2. Name of conference attended
3. Date of MITTIC HBCU hackathon pitch delivery
4. Team/Concept name
5. NASA IP used for MITTIC HBCU hackathon concept.

Selected teams who submit proof of completion of a non-NASA sponsored training course will be awarded additional points toward the score of their proposal.

Participation in a L'SPACE Academy, MITTIC HBCU hackathon, or other training is NOT required to submit a proposal for NASA MITTIC.

MITTIC Fall 2023 / Spring 2024

Sample NASA Intellectual Property (IP) List

**Important! The 45 selections of NASA Intellectual Property in this document include extra details and webinars that may assist a team with development of their concept. However, a team may use any IP from the NASA patent portfolio as the basis for their business/proposal.

Aerospace	FACET: Future Air Traffic Management Concepts Evaluation Tool
	Method and System for Air Traffic Rerouting for Air-space Constraint Resolution - NASCENT
	Flight-Path Angles
	Flight Awareness Collaboration Tool (FACT)
	Unmanned Aerial Systems (UAS) Traffic Management
	Artificial Immune System-Based Approach For Airborne Vehicle Maneuvering
	Green aviation - improved aerodynamic efficiency and less fuel burn
	Multi-Objective Flight Control Optimization Framework
	Co-Optimization of Blunt Body Shapes for Moving Vehicles
	Aeroelastic Wing Shaping
	Multirotor Aircraft Noise Reduction
	AirBOS-SR: Visualizing Supersonic Shock Waves with Advanced Imaging Techniques
Communication	Soft Decision Analyzer
	Microwave Power Combiner
Environment	Flame Piloted Vortex (SCWO-FPV) Reactor
	Tool for Rapid Identification of TCE in Plants
Health	Methylotrophi Microorganisms Expressing Soluble Methane Convention Monoxygenase Proteins
	Rapid Nucleic Acid Isolation Method and Fluid Handling Devices
	Microorganism Cultivation Platform for Human Life Support
	Nanosensor Array for Medical Diagnoses
Information Tech and Software	Traffic Aware Planner
Manufacturing	Pyramid Image Quality Indicator
	Calibration System for Automated Fiber Placement
	Internal Friction Reduction (IFR) Tool
	Laser Wire Direct Closeout (LWDC)
	System for In-situ Defect Detection in Composites During Cure
	Durable Redundant Joint (DRJ)

Materials and Coatings	Silicon Carbide Fiber Tows
	Carbon Fiber-Carbon Nanotube Yarn Hybrid Reinforcement
	Multilayered Fire Protection System
Mechanical and Fluid Systems	Method to Reduce Stabilization Time for Shape Memory Alloys
	Compact Active Vibration Control System
	Spacecraft Atmosphere Carbon Dioxide (CO2) Capture via Deposition
Optics	Active Pointing Monitor for a 2-axis Optical Control System
Power	Li-ion Cell Calorimeter
	Relaxor Piezoelectric Single Crystal Multilayer Stacks for Energy Harvesting Transducers
Robotics	Multi-Parameter Aerosol Scattering Sensor
	Robotic Assembly of Photovoltaic Arrays
	Autonomous Crash Management System (CMS)
Sensors	Multidimensional Damage Detection System
	Luminescence-Based Temperature Mapping and Sensing Systems
	Multivariate Monitoring for Human Operator and Machine Teaming
	Universal Wireless Flight Sensor Systems
	Floating Ultrasonic System
	Electric Field Imaging System

MITTIC

MUREP Innovation and Tech Transfer Idea Competition

Website HTTP://GO.NASA.GOV/NASAMITTIC

Email HQ-MITTIC@MAIL.NASA.GOV

#SpaceToPitch

The MITTIC team looks forward to receiving your ideas!

Misti Moore
Activity Manager

Dustin Kinnison
Education Project Manager

Olivia Stiver
Education Project Coordinator II

Fall 2022 Winning Team

University of St. Thomas

Spring 2023 Winning Team

University of Massachusetts-Boston

List of Institutions Who Have Previously Competed with MITTIC

Institutions are listed alphabetically. Names in bold are previous winners of Space Tank.

Alcorn State University
Bakersfield College
Boston College
California State University-Los Angeles
City College of San Francisco
College of Marin
Colorado State University-Pueblo
East Los Angeles College
El Camino College
Fayetteville State University
Fullerton College
Hampton University
Hartnell College
Langston University
Lincoln University
Lone Star College System
Los Angeles City College
Morgan State University
Navajo Technical University
New Mexico Institute of Mining and Technology
Norfolk State University
Pasadena City College
Prairie View A&M University
San Jose State University
Santa Monica College
Sitting Bull College
Tufts University
University of Houston-Clear Lake
University of Massachusetts-Boston
University of Puerto Rico-Rio Piedras
University of St. Thomas
University of Texas at Austin
Xavier University of Louisiana