

UAS 3.0 First Responder UAS Triple Challenge: Speed, Resilience, Security

Challenge 3.1: FastFind – UAS Search Optimized

Introduction:

Join us for this exciting Unmanned Aircraft System (UAS) prize competition using your ingenuity and hardware build expertise to create a concept for a UAS prototype. The top competitors of the challenge will compete for up to \$260,000! The results of the FastFind – UAS Search Optimized Challenge (FastFind Challenge) will support the public safety community and its stakeholders. You can make a difference! To enter for Stage 1, submit your entry starting August 2, 2021 with a deadline of September 30, 2021. To enter as a Walk-on Contestant in Stage 2, submit your entry by May 6, 2022. Continue reading to learn more about challenge stages and details.

Challenge Background:

The National Institute of Standards and Technology (NIST) Public Safety Communications Research Division (PSCR), in conjunction with Mississippi State University and Kansas State University, is hosting a 3-stage challenge, with a first place prize of \$40,000 in the final event and prize awards totaling up to \$260,000 for top designs throughout the FastFind Challenge. PSCR's Open Innovation team engages public safety entities, government, academia, and industry to identify innovation opportunities and foster technology advancements for public safety communications through Prize Competitions and Challenges.

Goals and Objectives:

The purpose of this Challenge is to advance UAS technologies by building and flying a UAS designed to support first responder search and rescue (SAR) operations. Specifically, this challenge is looking at enabling law enforcement as well as other emergency services to search a heavily forested area for missing persons using a UAS. The goal of this challenge is for Contestants to design, build, and fly a complete UAS solution that helps a SAR team locate multiple missing persons in a thick forested area by improving image detection and enhancing navigation techniques to 'close the distance' more quickly.

Challenge Stages:

The FastFind Challenge is a 3-stage competition to design, develop, and demonstrate UAS solutions that support first responder SAR operations. Below are details of each stage of the Challenge.

Stage	Contest Description	Review Criteria Summary	Number of Contestants Eligible to Compete	Key Dates
1	Solution Description	Clarity, feasibility, plausibility using concept paper, resume and summary slide	Open to all eligible teams/Contestants	30 SEP 2021 submission deadline
2	Video Test & Safety Evaluation	Video proof of a working solution and validation of Bill of Materials (BOM)	Up to 15 teams selected and invited from Stage 1	6 MAY 2022 submission deadline
	Walk-on Evaluation	Clarity, feasibility, and plausibility of Solution Description, with Video Proof of a working solution and BOM	Open to all eligible teams/Contestants	6 MAY 2022 submission deadline
3	Live Test & Evaluation	UAS specification and safety verification Live evaluation and demonstration of UAS	Up to 10 teams invited from Stage 2	20-22 JUNE 2022 Competition in Starkville, MS

Awards:

Each stage of the challenge has prize awards listed in the following table.

Award Ranking	Number of Awards	Award Value
Stage 1	up to 15	\$7,000 each, up to \$105,000 total
Stage 2	up to 10	Check-in Review: \$3,000 each, up to \$30,000 total
	up to 10	Video Evaluation: \$5,000 each, up to \$50,000 total in travel prize awards for Contestants invited to compete in Stage 3
Stage 3	up to 4	Best Performance: up to \$70,000 1 st \$40,000, 2 nd \$20,000, 3 rd \$10,000 First Responder's Choice award: up to \$5,000
		Total Challenge Award = \$260,000

NOTE: This table only describes prize awards; additional Contestants may win an invitation to participate in challenge stages but not be eligible to receive prize awards. All Stage 3 Contestants are eligible to compete for all Stage 3 prizes.

Summary of Important Dates:

Date	Event
August 2, 2021	FastFind Challenge is open for proposal submissions through challenge website; begin Stage 1
September 30, 2021	FastFind Challenge is closed for Stage 1 proposal submissions
October 29, 2021	Stage 1 Winners Announced; begin Stage 2
January 10, 2022	Stage 2 Check-in Review conducted with eligible Stage 2 Contestants
January 28, 2022	Stage 2 Check-in Review Winners Announced
April 8, 2022	Walk-on submissions open
May 6, 2022	Stage 2 Video Evaluation submissions due including Walk-on submissions
May 13, 2022	Stage 2 Video Evaluation Winners Announced; begin Stage 3
June 20-22, 2022	Live Test & Evaluation (dates may change based on weather delays)
June 30, 2022	Stage 3 Final Winners announced

NOTE: NIST reserves the right to revise the dates at any time.

Program Email Address:

Questions about the FastFind Challenge should be directed to uaschallenge@k-state.edu.

Official Rules for Stages 1-3

This document outlines the official rules for the FastFind Challenge. Nothing within this document or in any supporting documents shall be construed as obligating the Department of Commerce, NIST or any other Federal agency or instrumentality to any expenditure of appropriated funds, or any obligation or expenditure of funds in excess of or in advance of available appropriations.

Summary of Challenge

The following is a summary of each contest. For more information, please review the full terms and conditions for each contest as provided throughout this document.

Stage 1- Solution Description

The Solution Description stage invites all eligible Contestants to complete concept paper submission requirements. Contestants' solution will be reviewed by a panel of subject matter experts and judges who will make their selections based on the clarity of the submission, the feasibility of the solution, and how well the submission addresses the Operational Use Case and UAS Design Specifications of the Challenge.

- Up to 15 Contestants will receive awards including invitations to advance to Stage 2: Video Test & Safety Evaluation and/or prize awards.

Stage 2 – Video Test & Safety Evaluation

In this stage, Contestants will implement the design approach from their concept paper by completing their prototype solution and submitting materials for Check-in Review and Video Evaluation.

- Check-in Review: Up to 10 Contestants will be selected to receive prize awards and an invitation to advance to the Video Evaluation. Five additional Contestants may win an invitation to advance to the Video Evaluation.

Walk-on Evaluation

As part of Stage 2, Walk-on Contestant entries will be evaluated for eligibility and performance with an opportunity to advance to Stage 3.

- Video Evaluation: Up to 10 Contestants (which may include any Stage 2 Contestants or Walk-on Contestants) will be selected to receive invitational travel prize awards and an invitation to advance to Stage 3: Live Test & Evaluation.

Stage 3 – Live Test & Evaluation

The Live Test & Evaluation Contest is the final stage of the Challenge and consists of the live competition in Starkville, MS. Stage 2 winners will travel to Starkville, MS to compete in Stage 3.

All Contestants will be required to complete a UAS safety check prior to demonstrating their prototype drones' capabilities. Contestants who pass the initial compliance review will be evaluated and scored by a panel of judges and, based on those scores, may receive prize awards.

Safety Specific Requirements:

- All flights shall comply with local, state, and federal laws and regulations.
- All flights shall occur at authorized UAS flying areas.
- All pilots shall be Part 107 certified and covered by UAS insurance with a minimum coverage of \$1M prior to conducting any flights outside of an enclosed test facility.
- UAS energy sources must be safely integrated into the system (battery, liquid fuel, etc.)
- Any design that is deemed to pose a significant risk may be disqualified or not selected to advance.

UAS Design Specification:

UAS entered for the FastFind Challenge will be subject to the requirements outlined in the table below.

Requirement Title	Requirement Definition	Challenge Requirement
Maximum Gross Takeoff Weight	The Maximum Gross Takeoff Weight (MGTW) is the maximum allowable takeoff weight for the UAS. This includes everything that is on-board or otherwise attached to the aircraft.	The UAS must have a MGTW less than 55 pounds.
Total System Weight	Total System Weight is the weight of the entire system (to include UAS, Ground Control Station, spares, fuel, sensor, and storage).	Total System Weight shall not exceed 120 pounds.
System Cost	System cost is the total cost of all components of the system to include (software, hardware, sensor, spares, and custom-made items), with exception of the RTK-GPS. All components are listed in the BOM.	The system cost shall not exceed \$20,000.
Degraded Takeoff/Landing Capability	A degraded takeoff/landing area is an area that is typically unsuited for standard flight operations. The area can be small, uneven, and does not have a conventional runway.	The UAS shall be capable of vertical takeoff and landing (VTOL) and must be able to operate in a degraded takeoff/landing area.
Loiter	Loiter is the ability of the UAS to fly in a specified sphere to a defined position in the air.	The UAS shall be able to loiter within a small defined box (750 ft x 750 ft x 20 ft) centered around a defined position and altitude.

Level of Autonomy	Level of Autonomy refers to the spectrum of independence that the UAS can operate.	The UAS must be capable of complete auto takeoff/landing and waypoint navigation.
Real-Time Video	Real-time video is the ability to provide full motion video to the ground control station during anticipated mission operations.	The UAS shall provide real time full motion video to the ground control station at a minimum resolution of 1280 X 720 progressive (720p).
GPS	GPS is a global navigation satellite system (GNSS) providing geolocation and time information to a GPS receiver.	The UAS shall be equipped with a Global Position System.
RTK-GPS	A real-time kinematic (RTK) global positioning system (GPS) enhances the accuracy of satellite-based positioning using corrections broadcast in real-time to a roving GPS receiver from a ground-based stable GPS receiver.	The UAS shall be equipped with an RTK-GPS, and stable ground station that is broadcasting the differential GPS corrections. Note that the cost of the RTK-GPS will not be factored into scoring nor will it be factored into the minimum system cost requirement.
UAS Insurance	UAS (liability) insurance covers damage to third party property and injury to other people.	The team shall have UAS (liability) insurance or demonstrate financial responsibility with a minimum coverage of \$1M prior to conducting any flights outside of an enclosed test facility.
Flight termination system (FTS)	The FTS is a subsystem that is able to immediately cut power to all of the UAS motors at once when activated or initiates an inverted dive for a horizontal flight aircraft. Activation shall be possible for the following: 1. If the UAS passes a geofence set by the Contestant. 2. If the UAS is disconnected from the flight controller for a set amount of time. 3. To allow for a “kill” command to be sent to the UAS via the controller.	The UAS shall be equipped with an FTS (i.e., a Kill Switch) that when activated cuts power to all motors. Specific configuration for the FTS and geofence will be defined by the NIST Challenge team.

Stage 1: Solution Description

Stage 1 invites all eligible Contestants to complete concept paper submission requirements. Contestants’ solution will be reviewed by a panel of subject matter experts and judges who will make their selections based on the clarity of the submission, the feasibility of the solution, and how well the submission addresses the Operational Use Case and UAS Design Specifications of the FastFind Challenge. Refer to the Stage 1 evaluation criteria and design specifications when developing your submission.

How To Enter Stage 1:

Visit the Challenge website [<https://www.ustriplechallenge.com>] to review the stages in the FastFind Challenge.

- Visit Challenge.gov to review the series of stages in the FastFind Challenge.
- Complete the official entry form that will include information on key team members and their ability to accomplish the project.
- Submit the Solution Description materials which include a concept paper, resume, official entry form, and one-page summary slide via the Challenge website [<https://www.ustriplechallenge.com>]

Operational Use Case:

The operational use case provides contextual, user centric, design information. This is not intended as development requirements, rather the operational use case is to help focus Contestants on the contextual aspects of the UAS Design Specification.

Imagine you are a member of a search and rescue (SAR) team looking for multiple lost hikers in a heavily forested area. A common tool that is used to search above treetops, and in large areas, is a UAS with an optical camera. Unfortunately, due to the heavy forest vegetation, traditional optical cameras are ineffective. What sort of improvements could you make to this system (UAS & sensors) to entirely mitigate or remove the problem created by the foliage? For example, improvements to this UAS SAR system could take the form of thermal imaging sensors, acoustic sensors, air sampling sensors, etc. Additionally, the UAS autopilot could be programmed to fly more effective search patterns through data analytic methods or to move closer to a suspected missing person's location from sensor inputs. The UAS must have the ability to search for the lost hikers from as far away and as fast as possible.

There are several UAS design features that need to be considered in support of public safety agencies.

- The system needs to be cost effective to fit a first responder's budget.
- The UAS needs to be easily deployable to operate in degraded launch areas at any time, so the capability of the UAS to have VTOL is necessary.
- The UAS should be compact since space in a first responder vehicle is often limited.
- When the UAS runs low on power and needs to land, the process to refuel or recharge the system should be simple to quickly resume flight.
- The UAS should be easily pilotable.
- The system should be able to search as fast as possible for all missing persons.
- The system should be able to identify missing persons from great distances.

Solution Description Content Requirements:

The concept paper will be created and submitted by all registered users using an online form available through [<https://www.uastriplechallenge.com>]

Section	Word Limit	Description
Cover Page and Abstract	300 words	<p>Include the following:</p> <ul style="list-style-type: none"> ○ Contestant name (Individual name, Team name, Organization, Company). ○ Point(s) of Contact. ○ Conceptual Description of the system. The unique aspects of the Contestant’s approach and the potential impact that the proposed approach could have in achieving the goals of the challenge.
Solution Description	700 words	<p>Addressing the requirements should be your primary objective, therefore, create your concept paper to address the evaluation criteria. Below are a few options to consider:</p> <ul style="list-style-type: none"> ○ The competitive advantage offered by the Contestant’s approach or solution to the goals and objectives of the challenge as well as to the operational use case. ○ The current state-of-the-art in the relevant field and application, including key shortcomings, limitations, costs, and challenges and how the proposed project will overcome the shortcomings, limitations, and challenges relevant to the goals and objectives of the prize challenge. ○ High-level vision for performance metrics. Describe what will be produced, when it will be produced, and how it will be verified. Start by defining the baseline capability and end with a project performance metric in quantifiable and verifiable terms. Include interim performance metrics which will be closely reviewed for flight feasibility and endurance. ○ Effective distance (in feet) the proposed solution can identify a person. ○ MGTW in pounds. ○ Estimated set up/store time in minutes (from unpacking the system in its storage configuration to takeoff.) ○ Estimated cost of the system in United States Dollar (USD).
Resume Information for Key Team Members	300 words	<p>The key team members and why they are well suited to accomplish the project, with resume information to support their qualifications.</p>
Summary Slide	1 page uploaded	<p>Contestants are to provide a single slide summarizing the proposed project. This can be a presentation slide or PDF summary of the proposal.</p>

Evaluation Criteria and Judging:

NIST will review each Contestant entry in the Solution Description. A submission that fails to meet the compliance criteria will be disqualified and will be ineligible to compete in this stage. Submissions that pass the initial compliance review will be evaluated and scored by a panel of judges. NIST makes an independent assessment of each concept paper based on the scoring criteria outlined below. Do not include sensitive materials in the concept paper, for example personally identifiable information such as social security numbers or business sensitive information, tax id numbers, etc.

Stage 1 Scoring Criteria

Criteria Title	Criteria Definition	Criteria Requirement
Completeness (50%)	Completeness of the document is defined by how well the document answers the question and requirements of the challenge.	The document shall answer questions including, but not limited to, the following: <ul style="list-style-type: none">○ How would you summarize the features of your system?○ How would the system present a solution to the challenge and how is it better than existing system?○ How did you come up with your solution?○ How well does your solution cater to a first responder operator?
Understandability (20%)	Understandability of the document is defined by how well the audience of the document is able to describe the details, regardless of the amount of technical information within the document.	The document must be easily understood from both a layman's point of view and a subject matter expert's point of view.
Feasibility (20%)	Feasibility is defined by how realistic, and in scope, the solution is with a high likelihood of meeting the requirements.	The document must showcase the feasibility of the solution in full detail.
Spelling/Grammar (10%)	The spelling/grammar of the document is defined by how correct the spelling and grammar is throughout the document.	The document must have a minimal amount of spelling and grammatical errors. (For example, run on sentences, misspellings, improper verb/noun use, etc.)

Concept Papers will be evaluated based on the Scoring Criteria above. The specific scores will not be released publicly or provided to the Contestant. Up to 15 Contestants will be awarded prize awards of \$7,000 each and receive an invitation to Stage 2: Video Test & Safety Evaluation. Winners shall provide proof of UAS insurance or demonstrate financial responsibility prior to receiving the Stage 1 award.

STAGE 2: Video Test & Safety Evaluation

In this stage, Contestants will implement the design approach from their concept paper by completing their prototype solution and submitting materials for Check-in Review, videos of their system in flight, and a Bill of Materials (BOM). There are two phases to Stage 2; Check-In Review and Video Evaluation. Walk-On Contestants may participate in the Video Evaluation phase. Contestants selected by the Judging panel as winners of Stage 2 may receive prize awards and will be eligible to move forward to Stage 3 as described below.

How To Enter Stage 2:

Visit the Challenge website [<https://www.ustriplechallenge.com>] to review the stages in the FastFind Challenge.

- Once Contestants are selected from Stage 1, they will be required to participate in an introduction and Stage 2 challenge webinar.
- Contestants will review the terms and conditions of participation and accept the terms and conditions for entry.
- Contestants will be required to participate in a Check-in meeting with the NIST team to report on progress and be eligible for Check-in Review prize awards.
- Contestants will create and submit a BOM to ensure compliance.
- Contestants will provide their test flight video for review and verification of flight.

BOM Requirement:

Contestants must keep records of all hardware and software purchased or created for the prototype to function in the form of a BOM to ensure their entry is compliant. The BOM must show that all components included in the system are acquired appropriately, accounted for, and reported correctly to ensure the team stays below the maximum system cost allowed for their system. The BOM shall include:

- Each item in the system with its part number, internet link or URL that identifies where to procure the item, unit cost, quantity, and total cost.
- Custom or make items shall have the unit cost estimated, their fabrication source defined, material, and material volume estimated.

Check-in Review Requirements:

The Check-in Review is a meeting between the NIST Challenge team and Contestants to demonstrate their progress toward achieving their proposed design. This phase of Stage 2 is limited to those Contestants invited from Stage 1. During the Check-in Review, Contestants will present information about the status of their UAS solution. Contestants will present details of the planned design, estimated or actual BOM, an actual implemented subsystem, and a status of the project schedule.

For the Check-in Review, do not include proprietary or sensitive information. The check-in meeting will be scheduled for all eligible Contestants using an online form available through [<https://www.uastriplechallenge.com>]. Check-in Review will be judged and scored based on the review documents and presentation with content that shall include the following:

- Information about deviations from the Solution Description submitted in Stage 1
- Details of the planned system design
 - Status of the proposed sensor to locate missing persons
 - Estimated Flight Endurance
 - Estimated or actual MGTW
- Details of the logistics of the project
 - Status of ordered parts, components, or subsystems
 - Updated estimate of total cost of the system
 - Status of the project schedule
- Any other details deemed meaningful by team.

Evaluation Criteria and Judging:

NIST will review the Check-in Review materials for all eligible Stage 2 winners. A submission that fails to meet the compliance criteria may be disqualified and not receive prize awards for Stage 2 - Video Test & Safety Evaluation. Submissions that pass the initial compliance review will be evaluated and scored by a panel of judges. An evaluation of a submission by a panel of judges does not constitute NIST’s final determination of contestant or submission eligibility. Submissions will be judged according to the criteria below:

Stage 2 Check-in Review Scoring Criteria:

Criteria Title	Criteria Definition	Criteria Requirement
Completeness (50%)	Completeness of the Check-in Review is defined by how well the materials presented address the details of the planned system design.	The review must sufficiently outline the Status of the proposed sensor to locate missing persons, the Estimated Flight Endurance, and the Estimated or actual MGTW. Documents, slides, or presentation materials shall be submitted for review.
Project logistics (50%)	Project logistics of the Check-in Review is defined by how well the materials presented address the overall planning of the project.	The review must sufficiently outline the status of ordered parts, components, or subsystems and provide an updated estimate of total cost of the system through an updated BOM. The review shall include detailed information on the status of the project schedule.

Check-in Review will be evaluated based on the Scoring Criteria in the table above. The specific scores will not be released publicly or provided to the Contestant. Up to 10 Contestants will be selected to receive prize awards of \$3,000 each and an invitation to advance to the Video Evaluation. Five additional Contestants may win invitations to advance to the Video Evaluation.

Video Evaluation Requirements:

The video shall clearly depict all components of the system and UAS when in flight. The video submission shall include all content listed below:

- Demonstrates the flight worthiness of the Unmanned Aerial Vehicle (UAV) and the validity of the proposed solution
- Is no less than 1280 x 720 in resolution
- Is no more than 30 minutes in length
- Shows a successful autonomous takeoff and landing
- Shows autonomous waypoint navigation controlled flight
- Demonstrates emergency protocols and emergency landing and/or immediate flight termination
- Demonstrates the ability to locate and identify a person
- Gives a Video ‘tour’ of system including:
 - Views of platform from multiple angles
 - View of avionics system
 - View of propulsion system
 - View of proposed sensor to locate missing persons
- Provides a Brief Overview of UAS flight performance
 - Demonstrate proposed solution
 - Flight Endurance
 - Max Gross Takeoff Weight
 - Any other metric deemed meaningful by Contestant.

Evaluation Criteria and Judging:

NIST will review the Video Evaluation submission for all eligible Stage 2 winners. A submission that fails to meet the compliance criteria may be disqualified and not receive prize awards for Stage 2 - Video Test & Safety Evaluation. Submissions that pass the initial compliance review will be evaluated and scored by a panel of judges. An evaluation of a submission by a panel of judges does not constitute NIST’s final determination of contestant or submission eligibility. Submissions will be judged according to the criteria below:

Stage 2 Video Evaluation Scoring Criteria:

Criteria Title	Criteria Definition	Criteria Requirement
Completeness (50%)	Completeness of the video is defined by how well the video answers the requirements of the challenge.	Video must include everything previously outlined in the Video Test and Safety Evaluation Requirements.
Validity of Solution (25%)	The validity of the solution is defined by how well the video describes and demonstrates the proposed solution.	Video must clearly demonstrate the full capabilities of the solution and briefly describe how they work.

Composition (10%)	The composition of the video is defined by how well the video is edited and flows throughout the presentation.	Video must have a clear and concise composition that does not distract the viewer from the details being shown in the video.
Quality of Manufacturing (10%)	The quality of manufacturing is defined by how well the system is built. This will be based on the video footage of the drone as well as on the BOM.	Video must show various angles of the UAS to give the viewer a clear picture of the quality of the manufacturing.
Effectiveness of Safety Protocols (5%)	The effectiveness of safety protocols is defined by how well the system shown in the video demonstrates the safety, reliability, and redundancies.	Video must showcase safety protocols of UAS to ensure the safety protocols are reliable.

Video Evaluation will be evaluated based on the Scoring Criteria in the table above. The specific scores will not be released publicly or provided to the Contestant. Up to 10 Stage 2: Video Evaluation Contestants (which may include any Stage 2 Contestants or Walk-on Contestants) will be selected to receive invitational travel prize awards of \$5,000 each and an invitation to advance to Stage 3: Live Test & Evaluation.

Official Rules for Walk-on Contestants:

Walk-on Contestants are Contestants who meet all eligibility and technical requirements that were defined in Stages 1 and 2, and have a fully compliant system, but who did not participate in Stage 1 or Stage 2: Check-in Review. Walk-on Contestants will submit all materials required for the Solution Description and Video Test & Safety Evaluation stages. Upon evaluation of their submission, as defined in the Official Rules for Stages 1 and 2, Walk-on Contestants will compete in Stage 2: Video Evaluation.

Contestants are limited to those selected from entries in the Walk-on Evaluation.

Walk-on Contestants are not eligible to receive prize awards associated with Stage 1 or Stage 2: Check-in Review.

How To Enter Stage 2: Video Evaluation as a Walk-on Contestant:

Visit the Challenge website [<https://www.ustriplechallenge.com>] to review the stages in the FastFind Challenge.

- Visit Challenge.gov to review the series of stages in the FastFind Challenge.
- Contestants will review the terms and conditions of participation and accept the terms and conditions for entry.
- Complete the official entry form that will include information on key team members and their ability to accomplish the project.

- Submit all required materials as instructed in “How to Enter” for the Stage 1 - Solution Description and Stage 2 - Video Test & Safety Evaluation as described in the Official Rules and challenge website. [<https://www.uastriplechallenge.com>]

STAGE 3: Live Test & Evaluation

Stage 3 is the final stage of the challenge and consists of the live competition in Starkville, MS. Stage 2 winners will travel to Starkville, MS to compete in the Live Test & Evaluation. All Contestants will be required to complete a UAS safety check prior to flights.

How To Enter Stage 3:

Visit the Challenge website [<https://www.uastriplechallenge.com>] to review the stages in the FastFind Challenge.

- Stage 2 Winners (all Contestants from Stage 2, including Walk-on Contestants, that were invited to Stage 3 are considered “Stage 2 Winners”) should be prepared to complete a similar series of safety checks on day one of Stage 3. All Contestants will be required to complete these safety checks prior to any FastFind Challenge flights.
- Once Contestants are selected from Stage 2, they will be required to participate in an introduction and Stage 3 challenge webinar.
- All operators or pilots must be Part 107 FAA certified or under the supervision of a certified pilot who is a member of the Contestant’s team.
- Contestants will undergo safety inspections and verification of FAA and FCC compliance on the first day. The remainder of the week will be used for the actual competition.
- Competition Support Personnel will brief the participants on the conduct of the challenge and provide them with their scenario-based mission.
- Competition support personnel will help facilitate contestants to solve the FastFind Challenge.
- The fuel source of the UAS is allowed to be changed or charged within that time frame if needed to complete the search.

Live Test & Evaluation Requirements:

The live competition shall be done in a safe manner and follow all the requirements outlined in the Flight and Weather requirements.

Flight Requirements:

Prior to flying, teams will be required to submit a flight log detailing a minimum of 10 piloted flight hours. The flight log should, at a minimum, detail the number of flights, and duration of each flight. To ensure safety and compliance with Part 107 FAA regulations throughout the duration of the flight, teams must adhere to the flight requirements outlined below. Failure to adhere to the flight requirements may result in disqualification from Stage 3.

- All operators or pilots must be Part 107 FAA certified or under the supervision of a certified pilot who is a member of the team.
- All operators or pilots must ensure visual line of sight of the UAS, as described by Part 107 rules, at all times.
- All operators or pilots must ensure that the UAS maintains an altitude of 400ft AGL (above ground level) or less.
- All operators or pilots must ensure that the UAS remains within the designated search area bounds.

Weather Requirements:

A system developed for first responders should support a wide range of weather patterns with maximum usefulness for the mission. However, due to practical restraints and safety considerations, Contestants shall consider these performance constraints for the UAS flight in Stage 3:

- Ambient air temperature under 110 degrees Fahrenheit
- Steady wind speeds less than 20 knots
- Wind gusts less than 25 knots
- Light rain as determined by NIST Challenge team.

The competition will immediately be delayed if a severe weather warning is issued. Additionally, the competition will be delayed if lightning is observed in the area. The NIST Challenge team will determine at what point, if any, the competition will be delayed due to rain.

Evaluation Criteria and Judging:

NIST will review each Contestant's Live Test & Evaluation demonstration. A demonstration that fails to meet the compliance criteria will be disqualified. Demonstrations that pass the initial compliance review will be evaluated and scored by a panel of judges. An evaluation of a demonstration by a panel of judges does not constitute NIST's final determination of contestant or demonstration eligibility. Demonstration will be judged according to the criteria below:

Stage 3 Live Evaluation Scoring Criteria:

Criteria	Criteria Definition	Criteria Metric
UAS Safety Review	Reviews the UAS safety redundancies and capabilities. These include auto land, return to takeoff location, and the FTS in case of lost connectivity for an extended amount of time or leaving testing perimeter designated by a geofence, as designated by the NIST Challenge Team.	Pass/Fail
Deploy Time (10%)	Time of system to be deployed from a stored configuration to flying.	Lower elapsed time = better

Recover Time (10%)	Time of system to be stored after landing.	Lower elapsed time = better
Search Time (25%)	Total time of system to search, find, and designate lost hikers.	Lower elapsed time = better
Distance From Target (20%)	Total distance a system can find and designate lost hikers.	Further distance = better
Target Identification Accuracy (15%)	Accuracy of target identification that minimizes false positive identification.	More accurate = better
System Cost (20%)	System cost is the total cost of all components of a system to include (software, hardware, sensor, spares, and custom-made items), with exception of the RTK-GPS. All components are listed in the BOM.	Lower cost = better

Demonstrations in Stage 3 will be evaluated based on the Scoring Criteria in the table above. The specific scores will not be released publicly or provided to the Contestant.

First Responder’s Choice Award Evaluation:

The First Responder’s Choice award will recognize a Contestant for their responsiveness to the needs and expectations of the public safety sector. This evaluation will consider the specialized features, user interfaces, user design elements, and mission-enabling capabilities created by the Contestant that make their entry well-suited for use by public safety. All Contestants in Stage 3 who pass the UAS Safety Review are eligible for the First Responder’s Choice award. Contestants will be evaluated at-large. All Stage 3 Contestants are eligible to win the First Responder’s Choice award and one of the First, Second and Third Place prize awards.

Final Prize Award Evaluation:

For the First, Second and Third Place awards for Best Performance, Contestants will be evaluated using a point system. Contestants who pass Stage 3 Scoring Criteria and have the highest aggregate score across all criteria will be ranked; the highest three scoring Contestants may receive the First, Second and Third Place prizes: 1st \$40,000, 2nd \$20,000, 3rd \$10,000. For the First Responder’s Choice award, the Contestant is not required to obtain a score in all Stage 3 criteria. Specifically, a Judging panel will evaluate the votes received based upon a simple majority. The First Responder’s Choice award is a prize award of up to \$5,000.

NIST reserves the right to decline to make awards or make fewer awards than anticipated.

Terms and Conditions

Terms and Conditions for Submission Requirements:

In order for submissions to be eligible for review, recognition and award, Contestants must meet the following requirements:

- Deadline - The submission must be available for evaluation by the end date noted in the "Important Dates" section of these rules.
- Each submission must be original, the work of the Contestant, and must not infringe, misappropriate or otherwise violate any intellectual property rights, privacy rights, or any other rights of any person or entity.
- It is an express condition of submission and eligibility that each Contestant warrants and represents that the Contestant's submission is solely owned by the Contestant, that the submission is wholly original with the Contestant, and that no other party has any ownership rights or ownership interest in the submission. The Contestant must disclose if they are subject to any obligation to assign intellectual property rights to parties other than the Contestant, if the Contestant is licensing or, through any other legal instrument, utilizing intellectual property of another party.
- Each Contestant further represents and warrants to NIST that the submission, and any use thereof by NIST shall not: (i) be defamatory or libelous in any manner toward any person, (ii) constitute or result in any misappropriation or other violation of any person's publicity rights or right of privacy, or (iii) infringe, misappropriate or otherwise violate any intellectual property rights, privacy rights or any other rights of any person or entity.
- Each submission must be in English.

Submissions containing any matter which, in the sole discretion of NIST, is indecent, obscene, defamatory, libelous, in bad taste, which demonstrates a lack of respect for public morals or conduct, which promotes discrimination in any form, which shows unlawful acts being performed, which is slanderous or libelous, or which adversely affects the reputation of NIST, will not be accepted, and will not be evaluated or considered for an award. NIST shall have the right to remove any content from the Challenge Website in its sole discretion at any time and for any reason, including, but not limited to, any online comment or posting related to the Challenge.

If NIST, in its sole discretion, finds any submission to be unacceptable, then such submission shall be deemed disqualified.

No Endorsement:

You agree that nothing in these Rules grants you a right or license to use any names or logos of NIST or the Department of Commerce, or any other intellectual property or proprietary rights of NIST or the Department of Commerce or their employees or contractors.

Judging Panel:

The submissions will be judged by a qualified panel of expert(s) selected by the Director of NIST. The panel consists of Department of Commerce, National Institute of Standards and Technology and non-Department of Commerce, National Institute of Standards and Technology experts who will judge the submissions using the judging criteria identified above in order to select winners. Judges will not (A) have personal or financial interests in, or be an employee, officer, director, or agent of any entity that is a registered Contestant in a challenge; or (B) have a familial or financial relationship with an individual who is a registered Contestant.

The decisions of the Judging panel for the challenge will be announced in accordance with the dates noted in the "Important Dates" section of these rules. NIST PSCR will not make Contestants' evaluation results from the Judging panel available to Contestants or the public.

In the event of a tie between contestants, the judges will review the evaluations of the contestant submissions to assess if there is a means based on the evaluation data to differentiate the submissions to break the tie. If the submissions cannot be differentiated to break the tie based on the evaluation data, the contestants shall split equally the combined prize amounts of the tie (for example, a tie for 1st place, where the 1st place prize is \$30,000 and the 2nd place prize is \$20,000, will result in the two contestants each being awarded \$25,000 (equaling $(\$30,000 + \$20,000)/2$). If this tie-breaking provision is applied, the tied contestants will share the highest-placed prize and the next lower place prize will be "skipped" (for example, contestants tie at 1st place, the 2nd place prize is skipped). This tie-breaking provision will be applied to all ties involving two or more contestants. In resolving all ties, the total cumulative value of prizes awarded will not change.

Verification of Potential Winners:

ALL POTENTIAL CHALLENGE WINNERS WILL BE SUBJECT TO VERIFICATION OF IDENTITY, QUALIFICATIONS AND ROLE IN THE CREATION OF THE SUBMISSION BY THE DEPARTMENT OF COMMERCE, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY.

Contestants must comply with all terms and conditions of the Official Rules. Winning a prize is contingent upon fulfilling all requirements contained herein. The potential winners will be notified by email, telephone, or mail after the date of winning results. Each potential winner of monetary or non-monetary award, will be required to sign and return to the Department of Commerce, National Institute of Standards and Technology, within ten (10) calendar days of the

date the notice is sent, an ACH Vendor/Miscellaneous Enrollment Form (OMB NO. 1510-0056) and a Contestant Eligibility Verification form in order to claim the prize.

In the sole discretion of the Department of Commerce, National Institute of Standards and Technology, a potential winner will be deemed ineligible to win if: (i) the person/entity cannot be contacted; (ii) the person/entity fails to sign and return an ACH Vendor/Miscellaneous Enrollment Form (OMB NO. 1510-0056) and a Contestant Eligibility Verification form within the required time period; (iii) the prize or prize notification is returned as undeliverable; or (iv) the submission or person/entity is disqualified for any other reason. In the event that a potential, or announced winner, is found to be ineligible or is disqualified for any reason, the Department of Commerce, National Institute of Standards and Technology, in their sole discretion, may award the prize to another Contestant.

Winners Not Eligible for Cash Prizes:

Winners who are found to be ineligible for cash prizes may still be publicly recognized. In the event that the prize award normally allotted to the place or rank of an ineligible winner occurs, the cash prize will be awarded to the next eligible winner in the series or ranking. Throughout the challenge, winners who are ineligible for cash prizes will continue to have opportunities to have their work viewed and appreciated by stakeholders from industry, government and academic communities.

Eligibility Requirements:

A Contestant (whether an individual, private entity, or team (“Contestant” herein)) must have registered to participate and complied with all of the requirements under Section 105 of the America COMPETES Reauthorization Act of 2010 (Pub. L. No. 111-358), as amended by Section 401 of the American Innovation and Competitiveness Act of 2016 (Pub. L. No. 114-329) and codified in 15 U.S.C. §3719 (hereinafter “America COMPETES Act” or “15 U.S.C. §3719) as contained herein.

A Contestant who registers or submits an entry (whether an individual, private entity, or team or anyone acting on behalf of a private entity or team) to participate in this Challenge represents that they have read, understood and agree to all terms and conditions of the Official Rules.

To be eligible to win a cash prize, a Contestant must register as an individual, private entity, or team as defined below:

- Individual: a person age 18 or older at time of entry and a U.S. citizen or permanent resident of the United States or its territories.
- Private Entity: a company, institution, or other organization that is incorporated in and maintains a primary place of business in the United States or its territories.
- Team: a group of individuals or a group of private entities, with at least one member of the team meeting the definition for either Individual or Private Entity.

- Contestants not eligible for cash prizes: a contestant that enters the challenge without the ability to claim a cash prize based on the eligibility requirements above. Contestants not eligible for cash prizes must be 18 years or older at time of entry and cannot be individuals on the denied persons list nor from entities or countries sanctioned by the United States Government.

For all Contestants, general eligibility requirements include:

- Contestants may not be a Federal entity or Federal employee acting within the scope of their employment.
- Contestants may not be a NIST employee.
- Non-NIST Federal employees acting in their personal capacities should consult with their respective agency ethics officials to determine whether their participation in this Challenge is permissible. A contestant shall not be deemed ineligible because the individual or entity used Federal facilities or consulted with Federal employees during this challenge if the Federal employees and facilities are made available to all contestants on an equitable basis.
- Contestants may not be a NIST contractor or associate, or private entity providing services to NIST acting within the scope of their contract, employment, or funding or acquisition agreement with NIST which would involve the use of NIST funding to support a contestant's participation in the challenge.
- Contestants may not be individuals or private entities which provide program support services to NIST including strategic planning, project / program management, communications, reporting, program evaluation, or other similar services to NIST.
- Individuals who are former NIST Federal Employees or NIST Associates are not eligible to enter as an individual or member of a team for 365 days from their last date of paid employment or association with NIST with the exception of individuals in a student internship, experiential learning, or similar temporary employment status.
- Any individuals (including an individual's parent, spouse, or child) or private entities involved with the design, production, execution, distribution or evaluation of the Challenge are not eligible to enter as an individual or member of a team.
- Employees of any official co-sponsoring entities are not eligible to enter.
- A Contestant (whether participating as an individual, private entity, or member of a team) must not have been convicted of a felony criminal violation under any Federal law within the preceding 24 months and must not have any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.
- Contestants must not be suspended, debarred, or otherwise excluded from doing business with the Federal Government.
- Individuals currently receiving NIST funding through a grant or cooperative agreement are eligible to compete but may not utilize the NIST funding for competing in this challenge.
- Previous and current PSCR prize challenge contestants are eligible to enter.

All Contestants must designate an Official Representative:

At the time of entry, all contestants must designate one individual to serve as their Official Representative, and one individual to serve as an alternate to assume the role and requirements of the Official Representative if, and only if, the first individual has resigned from their role as Official Representative or has failed to respond to NIST communications for a period of 30 consecutive days. The Official Representative will be the only individual with the authority to officially interact and communicate with NIST regarding the contestant-created materials, completion of tasks as part of the challenge, signing official documentation related to the challenge, providing information to process prize payments, and any other administrative requests related to the challenge.

The eligibility of a contestant is determined by the Contestant's registration status (individual, private entity or team) as defined above – the Official Representative does not determine the Contestant's eligibility.

- For Individual Contestants, by default the Official Representative must be the individual.
- For Private Entity Contestants, the Official Representative can be any individual designated by the Private Entity.
- For a Team Contestant
 - If the Team is comprised of Individuals, the Official Representative must be a team member who individually meets the eligibility requirements of an Individual Contestant.
 - If the Team is comprised of Private Entities, the Official Representative can be any individual designated by the Private Entity leading the team.
 - If the Team is comprised of a mix of Individuals and Private Entities, the Official Representative, designated by the team, can be any qualified individual meeting the requirements of an Individual or member of a Private Entity.

The Official Representative will be authorized to interact with NIST and be responsible for meeting all entry, evaluation, and administrative requirements of the challenge.

If in the event a contestant decides to withdraw their submission from consideration, the Official Representative must notify NIST in writing of their decision.

If a contestant (whether an individual, private entity, or team) is selected as a prize winner, NIST will award a single dollar amount to the account named in the standard form 3881 (ACH Vendor/Miscellaneous Payment Enrollment Form) by the Official Representative. The named account must belong to an individual or private entity as defined above in the eligibility requirements for Individual or Private Entity.

On behalf of the Team as defined above, the Official Representative shall be solely responsible for allocating any prize amount among the members of the Team. NIST will not arbitrate, intervene, advise on, or resolve any matters between team members.

Submission Rights:

Any applicable intellectual property rights to a submission will remain with the Contestant. The Contestant is not granting any rights in any patents, pending patent applications, or copyrights related to the technology described in the entry. However, the Contestant is granting the Department of Commerce, National Institute of Standards and Technology certain limited rights as set forth herein.

- The Contestant grants to the Department of Commerce, National Institute of Standards and Technology the right to review the submission, to describe the submission in any materials created in connection with this competition, and to screen and evaluate the submission, and to have the Judges, Challenge administrators, and the designees of any of them, review the submission. The Department of Commerce, National Institute of Standards and Technology, and any Challenge Co-Sponsors, will also have the right to publicize Contestant's name and, as applicable, the names of Contestant's team members and/or organization which participated in the submission following the conclusion of the competition.
- You grant to NIST, and any parties acting on NIST's behalf, the right to include your name and your company or institution name and logo (if your entry is from a company or institution) as a Contestant on the Challenge Website and in materials from NIST, and any parties acting on NIST's behalf, announcing Winners, Finalists or Contestants in the Challenge. Other than these uses or as otherwise set forth herein, you are not granting NIST any rights to your trademarks.
- The contestant grants the Department of Commerce, National Institute of Standards and Technology, a royalty-free, non-exclusive, irrevocable, worldwide license to display publicly and use for promotional purposes the contestant's entry ("demonstration license"). This demonstration license includes posting or linking to the contestant's entry on the Department of Commerce, National Institute of Standards and Technology websites, including the competition website and inclusion of the contestant's submission in any other media, worldwide.
- Any data generated in the evaluation of contestant submissions is the property of the Department of Commerce, National Institute of Standards and Technology. The Contestants, Reviewers, and Judges involved in the evaluation acknowledge and agree that NIST will own this evaluation data, and that the evaluation created data can be used in future research and development activities. To the extent that NIST is able to, NIST will anonymize for research purposes, whether it is used internally or published, any such data

and will not include any contestant's, reviewer's, or judge's personally identifiable information. The contestant acknowledges and agrees that the data generated through evaluation of submissions may be used by NIST for future research related to the challenge.

Warranties:

Each Contestant represents and warrants that the Contestant is the sole author and copyright owner of the submission; that the submission is an original work of the Contestant and that the Contestant has acquired sufficient rights to use and to authorize others, including the Department of Commerce, National Institute of Standards and Technology, to use the submission, as specified throughout the Official Rules, that the submission does not infringe upon any copyright or upon any other third party rights of which the Contestant is aware; and that the submission is free of malware.

The Contestant represents and warrants that all information submitted is true and complete to the best of the Contestant's knowledge, that the Contestant has the right and authority to submit the entry on the Contestant's own behalf or on behalf of the persons and entities that the Contestant specifies within the entry, and that the entry (both the information and materials submitted in the entry and the underlying technology/method/idea/treatment protocol/solution described in the entry):

- is the Contestant's own original work, or is submitted by permission with full and proper credit given within the entry;
- does not contain proprietary or confidential information or trade secrets (the Contestant's or anyone else's);
- does not knowingly violate or infringe upon the patent rights, industrial design rights, copyrights, trademarks, rights in technical data, rights of privacy, publicity or other intellectual property or other rights of any person or entity;
- does not contain malicious code, such as viruses, malware, timebombs, cancelbots, worms, Trojan horses or other potentially harmful programs or other material or information;
- does not and will not violate any applicable law, statute, ordinance, rule or regulation, including, without limitation, United States export laws and regulations, including but not limited to, the International Traffic in Arms Regulations and the Department of Commerce Export Regulations; and
- does not trigger any reporting or royalty or other obligation to any third party.

No Confidential Information:

Each Contestant agrees that no part of its submission includes any trade secret information, ideas or products, including but not limited to information, ideas or products within the scope of the Trade Secrets Act, 18 U.S.C. § 1905. All submissions to this prize competition are deemed non-proprietary. Since NIST does not wish to receive or hold any submitted materials

“in confidence” it is agreed that, with respect to the Contestant’s entry, no confidential or fiduciary relationship or obligation of secrecy is established between NIST and the Contestant, the Contestant’s team, or the company or institution the Contestant represents when submitting an entry, or any other person or entity associated with any part of the Contestant’s entry.

Additional Terms and Conditions:

This document outlines the Official Rules for the *First Responder UAS Triple: FastFind Challenge*. Nothing within this document or in any documents supporting the *First Responder UAS Triple: FastFind Challenge* shall be construed as obligating the Department of Commerce, NIST or any other Federal agency or instrumentality to any expenditure of appropriated funds, or any obligation or expenditure of funds in excess of or in advance of available appropriations.

Challenge Subject to Applicable Law:

All challenge phases are subject to all applicable federal laws and regulations. Participation constitutes each Contestant’s full and unconditional agreement to these Official Rules and administrative decisions, which are final and binding in all matters related to the challenge. Eligibility for a prize award is contingent upon fulfilling all requirements set forth herein. This notice is not an obligation of funds; the final award of prizes is contingent upon the availability of appropriations.

Participation is subject to all U.S. federal, state and local laws and regulations. Contestants are responsible for checking applicable laws and regulations in their jurisdiction(s) before participating in the prize competition to ensure that their participation is legal. The Department of Commerce, National Institute of Standards and Technology shall not, by virtue of conducting this prize competition, be responsible for compliance by Contestants in the prize competition with Federal Law including licensing, export control, and nonproliferation laws, and related regulations. Individuals entering on behalf of or representing a company, institution or other legal entity are responsible for confirming that their entry does not violate any policies of that company, institution or legal entity.

Resolution of Disputes:

The Department of Commerce, National Institute of Standards and Technology is solely responsible for administrative decisions, which are final and binding in all matters related to the challenge.

In the event of a dispute as to any registration, the authorized account holder of the email address used to register will be deemed to be the Contestant. The "authorized account holder" is the natural person or legal entity assigned an email address by an Internet access provider, online service provider or other organization responsible for assigning email addresses for the domain associated with the submitted address. Contestants and potential winners may be required to show proof of being the authorized account holder.

Publicity:

The winners of these prizes (collectively, "Winners") will be featured on the Department of Commerce, National Institute of Standards and Technology website, newsletters, social media, and other outreach materials.

Except where prohibited, participation in the Challenge constitutes each winner's consent to the Department of Commerce, National Institute of Standards and Technology's, its agents', and any Challenge Co-Sponsors' use of each winner's name, likeness, photograph, voice, opinions, and/or hometown and state information for promotional purposes through any form of media, worldwide, without further permission, payment or consideration.

Payments:

The prize competition winners will be paid prizes directly from the Department of Commerce, National Institute of Standards and Technology. Prior to payment, winners will be required to verify eligibility. The verification process with the agency includes providing the full legal name, tax identification number or social security number, routing number and banking account to which the prize money can be deposited directly.

All cash prizes awarded to Participants by the Department of Commerce, National Institute of Standards and Technology are subject to tax liabilities, and no withholding will be assessed by the Department of Commerce National Institute of Standards and Technology on behalf of the Participant claiming a cash prize.

Liability and Insurance:

Any and all information provided by or obtained from the Federal Government is without any warranty or representation whatsoever, including but not limited to its suitability for any particular purpose. Upon registration, all Contestants agree to assume and, thereby, have assumed any and all risks of injury or loss in connection with or in any way arising from participation in this challenge, development of any application or the use of any application by the Contestants or any third-party. Upon registration, except in the case of willful misconduct, all Contestants agree to and, thereby, do waive and release any and all claims or causes of action against the Federal Government and its officers, employees and agents for any and all injury and damage of any nature whatsoever (whether existing or thereafter arising, whether direct, indirect, or consequential and whether foreseeable or not), arising from their participation in the challenge, whether the claim or cause of action arises under contract, tort, or loss through negligence or otherwise. Upon registration, all Contestants agree to and, thereby, shall indemnify and hold harmless the Federal Government and its officers, employees and agents for any and all injury, death, and damage of any nature against third party claims for damages arising from or related to Challenge activities.

Contestants are required to demonstrate UAS (liability) insurance or demonstrate financial responsibility with a minimum coverage of \$1M prior to conducting any flights outside of an enclosed test facility for claims by a third party for death, bodily injury, or property damage, or loss resulting from an activity carried out in connection with participation in this Challenge and for claims by the Federal Government for damage or loss to Government property resulting from such an activity. The Federal Government shall be named as an additional insured under the contestant's insurance policy. Contestants are required to maintain such UAS (liability) insurance for the duration of Stages 2 and 3 of the Challenge. Depending on the site for Stage 3 of the Challenge, the flight-testing facility may also be a required, named additional insured under the contestant's insurance policy.

Records Retention and FOIA:

All materials submitted to the Department of Commerce, National Institute of Standards and Technology as part of a submission become official records and cannot be returned. Any confidential commercial information contained in a submission should be designated at the time of submission. Submitters will be notified of any Freedom of Information Act requests for their submissions in accordance with 29 C.F.R. § 70.26.

508 Compliance:

Contestants should keep in mind that the Department of Commerce, National Institute of Standards and Technology considers universal accessibility to information a priority for all individuals, including individuals with disabilities. The Department is strongly committed to meeting its compliance obligations under Section 508 of the Rehabilitation Act of 1973, as amended, to ensure the accessibility of its programs and activities to individuals with disabilities. This obligation includes acquiring accessible electronic and information technology. When evaluating submissions for this challenge, the extent to which a submission complies with the requirements for accessible technology required by Section 508 will be considered.

General Conditions:

This prize competition shall be performed in accordance with the America COMPETES Act.

The Department of Commerce, National Institute of Standards and Technology reserves the right to cancel, suspend, and/or modify the challenge, or any part of it, if any fraud, technical failures, or any other factor beyond the Department of Commerce, National Institute of Standards and Technology's reasonable control impairs the integrity or proper functioning of the challenge, as determined by the Department of Commerce, National Institute of Standards and Technology in its sole discretion. The Department of Commerce, National Institute of Standards and Technology is not responsible for, nor is it required to count, incomplete, late, misdirected, damaged, unlawful, or illicit votes, including those secured through payment or achieved through automated means.

NIST reserves the right in its sole discretion to extend or modify the dates of the Challenge, and to change the terms set forth herein governing any phases taking place after the effective date of any such change. You agree to the terms set forth herein and to all decisions of NIST and/or all of their respective agents, which are final and binding in all respects.

ALL DECISIONS BY the Department of Commerce, National Institute of Standards and Technology ARE FINAL AND BINDING IN ALL MATTERS RELATED TO THE CHALLENGE.