

OFFICIAL RULES

Reusable Abstractions of Manufacturing Processes (RAMP) Challenge Official Rules for National Institute of Standards and Technology Prize Competition

CHALLENGE AND ASTM STANDARD SUMMARY

Challenge Summary: The National Institute of Standards and Technology (NIST) is announcing the Reusable Abstractions of Manufacturing Processes (RAMP) Challenge, with support from the ASTM International, the National Science Foundation (NSF), and the American Society of Mechanical Engineers (ASME) Manufacturing Science and Engineering Conference (MSEC) Organizing Committee, to familiarize the community with a standard for modeling manufacturing processes that was developed under the ASTM's E60.13 Subcommittee on Sustainable Manufacturing. The RAMP Challenge calls on participants (either as an individual or as a team) to model any manufacturing process and demonstrate application of the ASTM E3012-16 Unit Manufacturing Process (UMP) representation for purposes of information sharing and sustainability assessment. The RAMP Challenge will provide an opportunity for participants to put this standard into practice in modeling a process of their own interest, and to share experiences in applying the standard across a variety of processes. Formal methods for acquiring and exchanging information about manufacturing processes will lead to consistent characterizations and help establish a collection for reuse of these models. Standard methods will ensure effective communication of computational analytics and sharing of sustainability performance data. Results of the competition will assist in demonstrating the use of a reusable standard format leading to models suitable for automated inclusion in a system analysis, such as a system simulation model or an optimization program.

ASTM Standard Summary: In March 2016, the NIST and ASTM International announced a new international standard that can "map" the critically important environmental aspects of manufacturing processes, leading to significant improvements in sustainability while keeping a product's life cycle low cost and efficient. Sustainability for manufacturing is beginning to be addressed through the recently approved ASTM Standard Guide for Characterizing Environmental Aspects of Manufacturing Processes (ASTM E3012-16). The standard provides a science-based, systematic approach to capture and describe information about the environmental aspects for any manufacturing production process or group of processes, and then use that data to make informed decisions on improvements.

CHALLENGE INFORMATION

Dates: The Submission Period begins 1/29/2018 at 9:00 AM Eastern Time (ET) and ends 04/20/2018, at 5:00 PM ET. Prize competition dates are subject to change at the discretion of NIST. Entries submitted before or after the Submission Period will not be reviewed or considered for award.

Submission Period: 1/29/2018 through 04/20/2018

Announcement of Finalists: 05/07/2018

Announcement of Winners: 06/22/2018

Event Website: Changes or updates to the prize competition rules will be posted and can be viewed at the Event Website: <https://www.challenge.gov/challenge/ramp-reusable-abstractions-of-manufacturing-processes/>. Results of the prize competition will also be announced on the Event Website.

Awards: First, Second, and Third Place Prizes, and up to five runners-up, will be selected by the Judges.

- First Place Prize is \$1,000
- Second Place Prize is \$750
- Third Place Prize is \$500
- Runner Up Prize is \$200

Point of Contact for the Competition: Questions about the RAMP prize competition can be directed to the RAMP Challenge Manager via the Event Website or by email at kcm@nist.gov.

RAMP Challenge Sponsor - NIST: The National Institute of Standards and Technology (NIST; www.nist.gov) is a non-regulatory Federal agency within the United States Department of Commerce. Founded in 1901, NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life. NIST carries out its mission through its programs, which include: The NIST Laboratories, conducting world-class research, often in close collaboration with industry, that advances the Nation's technology infrastructure and helps U.S. companies continually improve products and services; the Hollings Manufacturing Extension Partnership (MEP), a nation-wide network of local centers offering technical and business assistance to smaller manufacturers to help them create and retain jobs, increase profits, and save time and money; and the Baldrige Performance Excellence Program, which promotes performance excellence among U.S. manufacturers, service companies, educational institutions, health care providers, and nonprofit organizations, conducts outreach programs, and manages the annual Malcolm Baldrige National Quality Award, which recognizes performance excellence and quality achievement.

- **RAMP Supporting Organization - ASTM:** ASTM International is a globally recognized leader in the development and delivery of voluntary consensus standards. Today, over 12,000 ASTM standards are used around the world to improve product quality, enhance health and safety, strengthen market access and trade, and build consumer confidence.
- **RAMP Supporting Organization - National Science Foundation:** The National Science Foundation (NSF) is an independent federal agency created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense..." NSF's goals--discovery, learning, research infrastructure and stewardship--provide an integrated strategy to advance the frontiers of knowledge, cultivate a world-class, broadly inclusive science and engineering workforce and expand the scientific literacy of all citizens, build the nation's research capability through investments in advanced instrumentation and facilities, and support excellence in science and engineering research and education through a capable and responsive organization.

- **RAMP Supporting Organization - ASME:** The ASME MSEC is held annually and will take place this year at the Texas A&M University from June 18-22, 2018 in College Station, Texas. The conference, sponsored by the Manufacturing Engineering Division (MED) of ASME, provides a forum to highlight and disseminate the most recent and cutting edge manufacturing research through both technical presentations, papers, posters, and panel sessions. The ASME is a not-for-profit membership organization that enables collaboration, knowledge sharing, career enrichment, and skills development across all engineering disciplines, toward a goal of helping the global engineering community develop solutions to benefit lives and livelihoods.
- **RAMP Supporting Organization – SME:** The SME works closely with manufacturing professionals, companies, educators, schools and communities, sharing knowledge and resources that generate solutions to manufacturing industry challenges. The North American Manufacturing Research Institution (NAMRI) of the Society of Manufacturing Engineers (SME) brings together researchers from leading companies, government laboratories, academic institutions and industrial think tanks located around the world for the advancement of the scientific foundation of discrete-parts manufacturing. NAMRI/SME sponsors the North American Manufacturing Research Conference (NAMRC), a prominent international forum for the presentation and discussion of technical innovations and manufacturing research. The NAMRC is held annually and will take place this year at the Texas A&M University from June 18-22, 2018 in College Station, Texas. The NAMRC is co-located with ASME Manufacturing Science and Engineering Conference (MSEC) and together, these conferences represent the largest advanced manufacturing research conference in North America.

ELIGIBILITY RULES

At the time of Entry, Participants must meet the following Eligibility Rules to be considered for a cash prize:

- A Participant (whether an individual, team, or entity) must have registered to participate and complied with all of the requirements under section 3719 of title 15, United States Code as contained herein.
- The Official Representative (individual or team lead, in the case of a group project) must be age 18 or older at the time of entry and a U.S. citizen or permanent resident of the United States or its territories.
- In the case of a private entity, shall be incorporated in and maintain a primary place of business in the United States or its territories.
- Participants may not be a Federal entity or Federal employee acting within the scope of his or her employment. Eligibility excludes NIST employees and NIST Research Associates as well as direct recipients of NIST funding awards to collaborate on the development of the ASTM standard E3012-16. Non-NIST Federal employees acting in their personal capacities should consult with their respective agency ethics officials to determine whether their participation in this Competition is permissible.

- Employees of the NSF, the ASTM, the ASME MSEC Organizers, and the SME NAMRC Organizers are excluded from participating but members of ASTM, ASME and SME are eligible to enter.
- Any other individuals or legal entities involved with the design, production, execution, distribution or evaluation of the RAMP Challenge are not eligible to participate.
- A Participant shall not be deemed ineligible because the Participant consulted with Federal employees or used Federal facilities in preparing its submission to the RAMP Challenge if the employees and facilities are made available to all Participants on an equitable basis.
- Participation is subject to all U.S. federal, state and local laws and 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.
- Participants must not be suspended, debarred, or otherwise excluded from doing business with the Federal government.
- Participants can consult with Federal employees or use Federal facilities in preparing its submission to the RAMP Challenge if the employees and facilities are made available to all Participants on an equitable basis.

ENTRY PROCESS

To enter, the Participant must create an account at challenge.gov and visit the Event Website, <https://www.challenge.gov/challenge/ramp-reusable-abstractions-of-manufacturing-processes/>. Entries sent to NIST in any manner other than through the Event Website will not be evaluated or considered for award.

A complete Entry, as described below in the Entry Requirements section, must be submitted in both pdf and text based (XML models) formats and include your process model, description, and analysis (including any figures, tables, and references), the name, email addresses, telephone number of the Participant who is officially representing the Entry; a username (if applicable) that is chosen by the team members, and confirmation that you have read and agree to the Official Rules contained herein. Entries must be complete, must not contain any confidential information and must be in English.

Submission Date: Participants may provide submissions beginning at 9:00 AM ET on 1/29/2018, to the Event Website. Submissions can be made no later than 5:00 PM ET on 04/20/2018, to the Event Website. Entries submitted before the start date and time, or after the end date and time, will not be evaluated or considered for award. Entries that do not comply with the formatting requirements set forth in these Official Rules will not be evaluated or considered for award.

Model types: Any manufacturing process can be modeled for purposes of information sharing and sustainability assessment. The modeled process can be one that the submitter has uniquely studied, or from open literature or other 3rd party sources. Any size scale and manufacturing process type (batch, continuous, and discrete event) is acceptable. Entry processes can span sizes from traditional scale down to nanoscale and be based on mechanical, electrical, chemical, biochemical, and bio technologies. Note that sustainability is a balance of competing objectives,

including cost and time as well as environmental considerations, so many different types of process performance metrics may be considered. In addition, the use of the models for system-level sustainability performance is encouraged.

Theme: This year's RAMP competition will be underlined by the theme, Tracking Resources and Flows through the System (hereinafter referred to as the “Theme”). The building blocks of each submission are the Unit Manufacturing Process (UMP) models, which represent Reusable Abstractions of Manufacturing Processes (RAMP). Two of the main drivers within this Theme are sustainability and composability. Particular interest will be paid to those submissions that address some element of both drivers as explained in the evaluation criteria. Possible approaches that participants could take to address this year's theme include (but are not limited to) the following:

- Composition of a set of UMP models to conduct material flow analysis (MFA)
- Waste minimization for part manufacturing (or product assembly) using UMP models
- Detailed sustainability analysis of a single process using multiple UMP representations
- Environmental and economic tradeoff analysis using alternative UMP methods
- Balanced benefits and burden related to sustainability of UMPs

Entries Allowed: Multiple entries are permitted. Each Entry will be reviewed independently. Multiple individuals or entities may collaborate as a group to submit a single Entry, in which case a single individual from the group must be designated as the Official Representative and must satisfy all of the eligibility requirements. Each entry must characterize at least one process yet participants can submit more than one entry. The participant must submit an analysis of a Unit Manufacturing Process that uses the ASTM E3012-16 Standard Guide for Characterizing Environmental Aspects of Manufacturing Processes, and that meets the criteria described herein.

Entry Requirements: All Participants agree to be governed by the Official Rules and only the Official Representative (individual or team lead, in the case of a group project) needs to meet the eligibility requirements to win a prize under 15 U.S.C. 3719 as described herein. Specifically, the Entry must include:

1. A project title page including project name, the name(s) of Participant(s), and the email address and phone number of the Participant who is officially representing the Entry.
2. An original model of the manufacturing process by application of ASTM E3012-16 Standard Guide for Characterizing Environmental Aspects of Manufacturing Processes. A Unit Manufacturing Process (UMP) information model adhering to structure and detail imposed by the NIST provided XML Schema Definition (XSD). The XSD is located at URL: <https://www.challenge.gov/challenge/ramp-reusable-abstractions-of-manufacturing-processes/>. A UMP is defined as the smallest element or sub-process in manufacturing that adds value through the modification or transformation of shape, structure, or property of input material or workpiece. Examples of a UMP are injection molding, die-casting and machining. A die-casting UMP can have individual operations such as die-preparation, clamping, injection, cooling, and ejection. A machining UMP can have multiple operations such as drilling, milling, or grinding. Composability is the ability to link individual unit manufacturing processes together to create a network or

system of UMPs that can characterize the environmental aspects of a production system or product.

3. A written narrative (fewer than 1500 words) describing how the Entry meets the Review Criteria described below in the Review Criteria section, including addressing the Theme.
4. An optional brief description of relevant case studies (fewer than 750 words) and/or a weblink (YouTube or Vimeo) to an original short (fewer than five minutes) video that describes the Entry and how it relates to the Theme. Participants must have permission to use all content in the video, including footage, music and images.

GUIDELINES FOR UMP INFORMATION MODEL TO BE PROVIDED IN THE ENTRY

Manufacturing Process Selection: Participants should choose any manufacturing process to demonstrate the application of a UMP representation using ASTM E3012-16 and in support of the theme above. ASTM is providing access to this standard free of charge for the purpose of the RAMP Challenge. To obtain a copy of the standard for use in the RAMP Challenge, Participants should select the following ASTM address (<http://www.astm.org/nist-ramp>). The standard is further described in a Journal of Manufacturing Science and Engineering paper titled “Standard representations for sustainability characterization of industrial processes.” The paper, Standard Representations for Characterization of Industrial Processes, may be downloaded from the NIST website: <https://www.nist.gov/node/1090636>. Examples of typical representations are posted at the Event Website.

Information Model Makeup: The identified UMP information model(s) described in Entry Requirements Section, item 2 above shall include:

XML instance: For each UMP information model presented in the submission, an XML document conforming to the XSD found on the Event Website shall be provided. Within the XML instance, the following must be addressed:

- Entity identification: Identify the five elements shown in the E3012-16 standard, including inputs, outputs, product and process information, resources, and transformation functions.
- Nomenclature: Describe the nomenclature of all recorded entities represented in the structured form, including any computed values in the transformation functions. This should include information such as names of the computed values, its meaning, type of the input variable, and the unit in which the data is represented in the model.
- Information sources: Source of the information used to define the UMP models, such as existing literature, industry case studies, and textbooks.
- Constraints and bounds: For each recorded parameter and the model itself, describe the feasibility bounds. For example, material density cannot be a value less than zero.

Note: The XML schema provides the structure necessary to meet these requirements. This portion of the submission will be submitted as an XML document.

To support the Information Model, the submission must also provide a PDF file/s that includes the following support information:

Introductory Information: Describe information about the submission and the Participants, including the title and Participant information.

Graphical Representation: The five elements shown in the E3012-16 standard must also be clearly identified in the graphical representation:

- Inputs: Identify inputs, which include information about the physical inputs to the process, such as energy and material.
- Outputs: Identify outputs, which include information about the physical outputs of the process, such as waste and finished parts.
- Product and Process Information: Identify the necessary product and process information that would be required to instantiate the transformation functions, such as CAD files, CAM files, technical drawings, and specifications sheets.
- Resources: Identify specific manufacturing assets, such as machines, tools, and operators, that would be required to instantiate the transformation functions.
- Transformation Functions: Describe a series of equations that compute the output from the input, product and process information, and resources.

Note: The Graphical Representation should match the XML instance as specified in the Information Model Makeup. The purpose of the Graphical Representation is for presentation and communication. If there are multiple UMPs submitted, a graphical representation for each UMP must be prepared.

Written Narrative: A PDF describing how the Entry meets the Review Criteria described below in the Review Criteria section, including addressing this year's Theme, Tracking Resources and Flows through the System.

- Validation: Explain how the model is validated. An example of validation includes procuring the data (i.e., inputs and outputs) from a physical (or virtual) manufacturing setting and validating this output against the computed output from the transformation function that is run with inputs from the real manufacturing setting. Compute the degree of error between the outputs from the model and the real manufacturing setting. Other approaches may be taken.
- Novelty of UMP representation in addressing the Theme. The main topic is underlined with various examples included for clarity.
 - Advancements to knowledge and understanding of UMP modeling. This may include innovative and expressive representations and methodologies, novel formal representations, more accurate or specialized metric, metric representations that support cascading to higher production levels, or exploration of variations for families of UMP models.
 - Advancements to standards supporting reuse models. This may include automated methods that allow linking of UMP models into systems, facilitating system composition through naming conventions or other methods, generalization that unifies a collection of processes, or standards-based methods for integration with applications.
 - Advancement of techniques for development and validation of UMP models. This may include demonstration of validation techniques for the effectiveness and accuracy of the

UMP models or techniques for producing useful derivatives of UMP models or creative methods for mining documentary model descriptions into formal representations.

Directions for submission: Multiple PDF and XML files may be submitted, but shall be uploaded as a single file submission, as a ZIP file. An example formatted to capture entry requirements is provided on the Event Website for the submission.

Awards: The Prize Purse for the RAMP Challenge is a total of \$3,250. The Prize Purse may increase, but will not decrease. Any increases in the Prize Purse will be posted on the Event Website. The Prize Purse will be used to fund one or more awards.

NIST will announce via the Event Website the top eight submissions (“finalist entries”) and the Entry(ies) to which the Judges have made a cash award (each, an “Award”). The anticipated number and amount of the Awards that will be awarded for this Competition is set forth in the Official Rules; however, the Judges are not obligated to make all or any Awards, and reserve the right to award fewer than the anticipated number of Awards in the event an insufficient number of eligible Entries meet any one or more of the Judging Criteria for this Competition, based on the Judges' evaluation of the quality of Entries and in their sole discretion. Awards will be made based on the Judges' evaluation of an Entry's compliance with the Judging Criteria for this Competition.

The Official Representative of all finalist entries will be notified in an email from NIST to the e-mail address provided in the submission document that they have been selected as a finalist. Finalists will be required to respond affirmatively and complete further documentation within five (5) business days that they meet the eligibility criteria set forth herein and they (in the case of a team, one designated representative) are able to participate in person at the 2018 ASME International Manufacturing Science and Engineering Conference (MSEC) at Texas A&M University from June 18-22, 2018 in College Station, Texas. Subject to the availability of funds, travel supplements to defray the costs of travel and conference participation may be available to participants who need assistance. Return of any notification as “undeliverable” will result in disqualification. If a finalist indicates they are unable to participate in the conference or does not respond within five (5) business days, NIST reserves the right to invite the next highest ranked Participant (who is not already a finalist), as determined by the subject matter experts, to participate as a finalist.

To win an Award, finalists must give a brief in-person presentation to the Judges during the MSEC conference in a special session dedicated to the RAMP Challenge. Winners will be determined by the Judging Panel at the MSEC Conference, and further verified by NIST. The winner verification process with NIST includes signing and returning via secure file transfer a winner verification form asserting the official representative's eligibility to participate in the competition and 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. Return of any notification as “undeliverable” will result in disqualification. After verification of eligibility, Awards will be distributed in the form of electronic funds transfer addressed to the official representative specified in the winning Entry. That Official Representative will have sole responsibility for further distribution of any Award among

Participants in a group Entry or within a company or institution that has submitted an Entry through that representative. Each list of Entries receiving Awards for the Competition will be made public according to the timeline outlined on the Event Website. The Official Representatives are responsible for all taxes and reporting related to any Award received as part of the Competition.

All costs incurred in the preparation of Competition Entries are to be borne by Participants.

EVALUATION, JUDGING, AND SELECTION OF WINNER(S)

Submission Evaluation Criteria

This section discusses how Participant submissions will be evaluated.

Entry Submission and Review

The requirements for submission of a complete Entry are detailed in the section “Entry Process.” Each Entry will be reviewed by subject matter experts, who will assess how well the Entry addressed each of the following evaluation criteria. For each Entry, subject matter experts will generate a numerical rating from 0 to 100 based on the five (5) weighted review criteria listed below. This rating will be supported by a brief narrative (fewer than 1500 words) of the technical merits of the submission in terms of the review criteria. Subject matter experts will provide their individual assessments to the RAMP Challenge Manager. The RAMP Challenge Manager will identify the top eight submissions (“finalist entries”). The finalist entries and the accompanying subject matter expert evaluations, both the rating and narrative, will be provided to the Judging Panel for their deliberation.

Review Criteria

Subject matter experts will consider five weighted review criteria (specified within parentheses) when evaluating submissions:

1. **Completeness:** Submission follows the guidelines and includes all necessary components. All submissions must describe the approach taken to validate the work and provide both a graphical and formal representation of the UMP information model. An example will be posted on the competition website. (10%)
2. **Complexity:** Model reflects the complexities of the manufacturing process, especially those which influence sustainability indicators such as energy and material consumption. (15%)
3. **Clarity and adherence to theme:** Model is clear in describing the process and the process-related information and its contribution to advancing the Theme. (30%)
4. **Accuracy:** Submission accurately models the process as shown through validation. (30%)
5. **Novelty:** Approach taken develops new techniques to address the Theme and to advance model reusability or reliability. (15%)

Judging Criteria: Eight finalist entries will be evaluated by the Judges in advance of and during the Finalist Presentations to take place at the 2018 ASME International Manufacturing

Science and Engineering Conference. NIST reserves the right to name fewer than eight finalists.

A panel of three (3) to five (5) judges will then be convened to rank the finalist entries and determine the winners. Judges will review each of the Entries and any corresponding technical assessments provided by subject matter experts. Judges will participate in a session at the 2018 ASME International Manufacturing Science and Engineering Conference where the finalists will give a 10-15 minute in-person presentation describing their submission and how well it meets the judging criteria. Time permitting, this will include a question and answer session after each presentation. Judges will deliberate and then rank the finalist entries based on review of subject matter results (75%) along with presentation clarity, content, and quality conveyed in a brief in-person presentation (25%) at the 2018 MSEC Conference.

REVIEWS AND AWARDS

Subject Matter Experts: Subject Matter Experts, to be selected by the NIST with assistance from Challenge supporters, will, as a body, represent a high degree of experience with manufacturing processes, process modeling, and sustainability assessment of manufacturing processes, and a balance of perspectives from relevant manufacturing sectors. Subject Matter Experts may consist of NIST Federal Employees, NIST Associates, employees of RAMP Challenge supporters, or their representatives. Subject Matter Experts will not select winners of any awards.

Judging Panel: The NIST Director will appoint a panel of highly qualified Judges. The Judging Panel will consist of individuals who are experts in the field of sustainability of manufacturing processes. Judges will deliberate and rank finalist entries according to the Judging Criteria described above. The top (up to eight) Entries ranked by the Judges will be selected to receive an Award. Judges may not have personal or financial interests in, or be an employee, officer, director, or agent of, any entity that is a registered Participant in this Competition and may not have a familial or financial relationship with an individual who is a registered Participant. In the event of such a conflict, a Judge must recuse himself or herself. Should this occur, a new Judge may be appointed to the panel.

--Terms and Conditions --

Intellectual Property Rights: Other than as set forth herein, NIST does not make any claim to ownership of your Entry or any of your intellectual property or third party intellectual property that it may contain. By participating in the Competition, you are not granting any rights in any patents or pending patent applications related to your Entry; provided that by submitting an Entry, you are granting NIST certain limited rights as set forth herein.

By submitting an Entry, you grant to NIST the right to review your Entry as described above in the section “Entry Submission and Review,” to describe your Entry in connection with any materials created in connection with the Competition and to have the Subject Matter Experts, Judges, Competition administrators, and the designees of any of them, review your Entry.

By submitting an Entry, you grant a non-exclusive, irrevocable, paid up right and license to NIST to use your name, likeness, biographical information, image, any other personal data submitted with your Entry and the contents in your Entry, in connection with the RAMP Challenge for any purpose, including promotion and advertisement of the Challenge and future challenges.

You agree that nothing in this Notice grants you a right or license to use any names or logos of NIST or the Department of Commerce or any supporting agency or entity, or any other intellectual property or proprietary rights of NIST or the Department of Commerce or any supporting agency or entity or their employees or contractors. You grant to NIST 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 Participant on the Event Website and in materials from NIST announcing winners of or Participants in the Competition. Other than these uses or as otherwise set forth herein, you are not granting NIST any rights to your trademarks.

Entries containing any matter, including team names, which, in the sole discretion of NIST, is indecent, defamatory, in obvious 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. If NIST, in its sole discretion, finds any Entry to be unacceptable, then such Entry shall be deemed disqualified and will not be evaluated or considered for award. NIST shall have the right to remove any content from the Event 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 Competition.

Confidential Information: By making a submission to the RAMP Challenge, you agree that no part of your submission includes any confidential or proprietary information, ideas or products, including but not limited to information, ideas or products within the scope of the Trade Secrets Act, 18 USC §1905. Because NIST will not receive or hold any submitted materials “in confidence,” it is agreed that, with respect to your Entry, no confidential or fiduciary relationship or obligation of secrecy is established between NIST and you, your Entry team, the company or institution you represent when submitting an Entry, or any other person or entity associated with any part of your Entry.

Warranties: By submitting an Entry, you represent and warrant that all information you submit is true and complete to the best of your knowledge, that you have the right and authority to submit the Entry on your own behalf or on behalf of the persons and entities that you specify within the Entry, and that your Entry (both the information and software submitted in the Entry and the underlying technologies or concepts described in the Entry):

- (a) is your own original work, or is submitted by permission with full and proper credit given within your Entry;
- (b) does not contain confidential information or trade secrets (yours or anyone else’s);

- (c) 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;
- (d) does not contain malicious code, such as viruses, malware, time bombs, cancelbots, worms, Trojan horses or other potentially harmful programs or other material or information;
- (e) 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 Administration Regulations; and
- (f) does not trigger any reporting or royalty or other obligation to any third party; and
- (g) does not contain any statement that is abusive, defamatory, libelous, obscene, fraudulent, or is in any other way unlawful or in violation of applicable laws.

Limitation of Liability: By participating in the RAMP Challenge, you agree to assume any and all risks and to release, indemnify and hold harmless NIST or any supporting agency or entity from and against any injuries, losses, damages, claims, actions and any liability of any kind (including attorneys' fees) resulting from or arising out of your participation in, association with or submission to the RAMP Challenge (including any claims alleging that your Entry infringes, misappropriates or violates any third party's intellectual property rights). In addition, you agree to waive claims against the Federal Government and its related entities, except in the case of willful misconduct, for any injury, death, damage, or loss of property, revenue, or profits, whether direct, indirect, or consequential, arising from your participation in the RAMP Challenge, whether the injury, death, damage, or loss arises through negligence or otherwise.

NIST is not responsible for any miscommunications such as technical failures related to computer, telephone, cable, and unavailable network or server connections, related technical failures, or other failures related to hardware, software or virus, or incomplete or late Entries. Any compromise to the fair and proper conduct of the RAMP Challenge may result in the disqualification of an Entry or Participant, termination of the RAMP Challenge, or other remedial action, at the sole discretion of NIST. NIST reserves the right in its sole discretion to extend or modify the dates of the RAMP Challenge, and to change the terms set forth herein governing any phases taking place after the effective date of any such change. By entering, 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.

NIST is not responsible for: (1) Any incorrect or inaccurate information, whether caused by a Participant, printing errors, or by any of the equipment or programming associated with or used in the RAMP Challenge; (2) unauthorized human intervention in any part of the Entry Process for the RAMP Challenge; (3) technical or human error that may occur in the administration of the RAMP Challenge or the processing of Entries; or (4) any injury or damage to persons or property that may be caused, directly or indirectly, in whole or in part, from a Participant's participation in the RAMP Challenge or receipt or use or misuse of an Award. If for any reason

an Entry is confirmed to have been deleted erroneously, lost, or otherwise destroyed or corrupted, the Participant's sole remedy is to submit another Entry in the RAMP Challenge.

Termination and Disqualification: NIST reserves the authority to cancel, suspend, and/or modify the RAMP Challenge, or any part of it, if any fraud, technical failures, or any other factor beyond NIST's reasonable control impairs the integrity or proper functioning of the RAMP Challenge, as determined by NIST in its sole discretion.

NIST reserves the right to disqualify any Participant or Participant team it believes to be tampering with the Entry process or the operation of the RAMP Challenge or to be acting in violation of any applicable rule or condition.

Any attempt by any person to undermine the legitimate operation of the RAMP Challenge may be a violation of criminal and civil law, and, should such an attempt be made, NIST reserves the authority to seek damages from any such person to the fullest extent permitted by law.

Verification of Potential Winner(s): All potential winners are subject to verification by NIST, whose decisions are final and binding in all matters related to the RAMP Challenge.

Potential winner(s) must continue to comply with all terms and conditions of the RAMP Official Rules described herein, and winning is contingent upon fulfilling all requirements. In the event that a potential winner, or an announced winner, is found to be ineligible or is disqualified for any reason, NIST may make an award, instead, to another Participant.

Privacy and Disclosure under FOIA: Except as provided herein, information submitted throughout the RAMP Challenge will be used only to communicate with Participants regarding Entries and/or the RAMP Challenge. Participant Entries and submissions to the RAMP Challenge may be subject to disclosure under the Freedom of Information Act ("FOIA").

Authority: 15 U.S.C. 3719.