

## **DTPH5615RA00001**

### **Pipeline Safety Research and Development Announcement**

#### **Announcement Details**

##### **Background**

Pipeline infrastructure in the United States (U.S.) is the primary means of transporting natural gas and moves the majority of hazardous liquid from production basins and ports to areas of consumption. The importance of energy pipelines to the U.S. economy and our standard of living requires that these assets must be safely maintained and appropriately expanded to sustain demand.

Research must play a larger role in finding the solutions to national, regional and local pipeline operational safety and environmental challenges. Some of these challenges involve having the best technology to efficiently and effectively meet or exceed Federal and State regulatory requirements. Other challenges are in keeping critical industry consensus standards fresh with the latest knowledge and know-how so that people, property and the environment are protected. PHMSA and the pipeline industry recognize the role of research in removing mutual challenges and, since 2002, have coordinated and collaborated on more than 221 projects and invested approximately \$87M of PHMSA funding, plus \$83M worth of shared resources.

This research enterprise is having a tangible impact toward developing technology, strengthening consensus standards and creating and promoting general knowledge to decision makers. The following high level summary illustrates some of the performance measures used by PHMSA to indicate progress in addressing pipeline challenges. More performance details are available at PHMSA's Pipeline Safety Research website <http://primis.phmsa.dot.gov/rd/performance.htm>.

- The submission of 20 U.S. Patent applications;
- The commercialization of 23 technology improvements;
- The submission of 92 papers to public events and journals;
- The public availability of 161 project final reports via the internet; and
- Over 17 million website visits since 2002 with over 1.1 million files being downloaded just since 2008.

In August 2014, the Government and Industry Pipeline R&D Forum brought together approximately 230 representatives from Federal, State and foreign government offices along with domestic and foreign natural gas and hazardous liquid pipeline operators. The forum's goals included identifying key challenges facing industry and government, sharing information on current research efforts, and identifying research that can help to meet the challenges.

The Forum further galvanized pipeline research coordination and collaboration by producing a national research agenda reflective of stakeholder consensus on what research should be solicited now to address identified pipeline challenges. Please visit [https://primis.phmsa.dot.gov/rd/mtg\\_080614.htm](https://primis.phmsa.dot.gov/rd/mtg_080614.htm) for more information about this important event and how it crafted the topics solicited in this RA.

## **Research Areas**

The August 2014 Government and Industry Pipeline R&D Forum was very successful resulting in the identification of several technical gaps as potential new research projects. Additionally, the Forum participants identified several dozen topics of high interest that could be solicited through the PHMSA R&D Program at a later date.

However, resource constraints do not allow the support of each and every research topic identified at R&D Forums. The chosen topics for this RA were determined after carefully reviewing Forum findings and available funding to ensure that possible new research is in line with direction identified in the [Pipeline Safety Improvement Act of 2002](#) or any other relevant congressional direction for PHMSA's program.

Interested parties should first visit the August 2014 forum webpage to understand how the R&D Forum crafted the topics solicited in this RA.

PHMSA anticipates a \$10M base investment to fund awards in the topic areas. Historically, individual project awards have been up to \$1M and consolidated programs up to \$5M. The budget is limited so the scope of any proposed project and timeline must be realistic to our program objectives. Proposed project costs by themselves should not become an exclusive factor in preventing a research award. In such cases, projects should be broken up into phases where the initial phase or two are what you specifically address in your white paper submission and generally address the potential of later phases, subject to the degree of prior success(es) throughout the project.

## **Research Sought With Resource Sharing**

The following research areas will be resource shared with a minimum of 50% cash funding coming from any non-federal source. For these research areas, PHMSA will fund up to 50% of the proposed project costs at award. Individual or consolidated white paper submissions are welcome. The resource sharing requirements will be officially conveyed in the letter requesting full proposals if and when a white paper is recommended for further consideration.

### Damage Prevention

#### **Technology – Developing System-Defense Tools for New and Existing Pipelines from Excavation Damage Threats.**

A project must evaluate the current costs of patrolling and monitoring by all means so that a performance/cost metric based recommendation can be made on what technology type and approach must be developed that incorporates the following attributes:

- Repeatability
- Limited false-positives in diverse environments
- Deployable in varying weather and terrain
- Detects encroachment and notifies before damage/vandalism occurs
- Maintenance free as possible

A timeframe to market of such technology improvement is 24-36 months

#### **Technology/Product - Intrinsically Locatable Plastic Materials (New construction and replacement)**

A project must investigate and test various material(s) that could be modified to enable intrinsic detection from above ground. The chosen material(s) must be matched with an above ground detection technology that can both locate the pipe and discern its burial depth and orientation from other utilities within the corridor with the following attributes:

- Cost effective
- Reliable/Repeatable
- 3D depiction via a graphical user interface
- Commodity neutral

A timeframe to market of such technology improvement is 24-36 months

### Leak Detection/Fugitive Methane

#### **Technology/General Knowledge - Refine/Enhance/Develop Methane Leak Survey Technologies and Methodologies to Quantify Detected Emissions from Relatively Small Volume Rate Leaks to Prioritize a Remedial Action Plan.**

A project must develop new or enhance existing sensing technologies to accurately quantify the rate and severity from non-hazardous or relatively small volume emissions attributed to natural gas pipeline leaks, and if needed more accurately locate the leaks. Leaks that are being targeted for this project are lower repair priority “non-hazardous” pipeline leaks that typically do not represent an existing or probable hazard to persons or property and can be reasonably expected to remain non-hazardous, such as a Grade 3 leak according to the Gas Piping and Technology

Committee (GTPC)). Typically these leaks continue to be monitored at regular intervals until the leak is re-graded, eventually repaired, or no longer results in a reading. Even though these leaks are considered non-hazardous to people or property, they can impact the environment especially if they leaking for a long time. For location considerations, in most cases the locations of these leaks are known following identification and prior to being classified as lower priority. In some cases, though, it is difficult to pinpoint location due to certain factors, such as if surveying in more extreme environmental conditions (i.e. winter patrols) or if soil or surface conditions prevent accurate pinpoint. There may also be certain leaks within this subset that should be repaired before others, so there is a desire to for a project to develop technologies and methodologies to help prioritize these leaks for repair. The technology under this project should be able to measure leaks of a very small nature coming from a wide range of physical conditions. The primary pipeline types targeted for this research include gas distribution, but may also include regulated oil and gas gathering, so environments may cover the extremes of highly urban and rural environments, as well as other environments in between. The sensors used with the technology can be deployed from hand held, mobile based and or airborne deployment platforms. The technology and methodology must volumetrically quantify leaks to enable risk ranking that is congruent to current Green House Gas reporting requirements. One idea to help enable risk ranking is to develop an emissions risk factor that could then be used by operators in other aspects of their risk ranking methodologies. Possible roadblocks of operational costs, ease of use, precision, regulatory considerations, and adaptability should be considered in the technology development and market research. The project must form and utilize recommendations from a Technical Advisory Committee comprised of regulators, pipeline operators and notable subject matter experts. The timeframe to market of such technology and methodology improvements is 24 months.

### Anomaly Detection & Characterization

#### **Technology - Develop/Enhance Inspection Technology for small diameter (2"-8") and Difficult to Inspect pipelines.**

A project must develop inspection technology for one or more pipeline material types that is internally deployed. For metallic pipes, the diameters sought for this new technology range from 2" to 8". For non-metallic pipes, the diameters sought for this new technology range from 2" to 8". The technology must have functionality and or performance requirements for identification and characterization of pipeline defects, especially cracks with a focus on small diameter pipelines that either matches or exceeds current capabilities of Probability of Detection and Probability of Identification. PHMSA would be interested in both the sensors and involved inspection platform(s) required to address various defect types in metallic and non-metallic pipes. Possible roadblocks around miniaturization of sensors and supporting hardware/power requirements should be well factored into the project scope in order to improve market penetration. Improvements to the market are suggested for 12-36 months.

## Materials

### **Technology – Development of Inspection Tools to Quantify Pipe Strength and Toughness**

A project must develop tools to accurately quantify pipeline strength and toughness either destructively or non-destructively that support integrity management process improvements. The tools should be designed for in ditch or for In-Line Inspection deployment applicable to steel pipes both that are in service or not, that would quantify the desired information from either in the pipe body and in the pipe seam located in all operating environments. The anticipated timeline to demonstrate is 18 months for determining pipe strength and within 36 months for determining toughness.

### **Research Sought Without Resource Sharing**

The following research areas will be funded 100% by the Federal Government. Individual or consolidated white paper submissions are welcome. This funding strategy will be officially conveyed in the letter requesting full proposals if and when a white paper is recommended for further consideration. This letter will also describe requirements for forming a Technical Advisory Panel comprised of 2-3 pipeline operators having assets relevant to the proposed project scope that will be utilized to make technical recommendations to PHMSA about the project execution.

## Leak Detection/Fugitive Methane

### **General Knowledge/Consensus Standard - Verification and Validation Framework for Assessing the Viability and Performance of New Natural Gas/Liquid Leak Detection and Quantification Technologies and Methodologies.**

There are a number of existing leak detection technologies, methodologies, standards and other protocols in use today, but sometimes technologies don't always work as well as advertised, there is inconsistency in the results depending on where it is applied and to what extent, or additional guidance and training is needed for users. The goal of this project is establish a verification and validation framework for assessing leak detection and quantification technologies and methodologies, and conduct field studies to validate both the technologies being used and the framework itself. A project must first establish the framework to be employed for measuring the viability and performance of such a leak detection system. The verification and validation framework must utilize recommendations from a Technical Advisory Committee comprised of regulators, liquid and gas pipeline operators and notable subject matter experts. The framework should embody the following attributes:

- Physical characteristics/operational information for a range of environments
- Current regulatory requirements
- Consideration of relevant standards, recommended practices, or publications such as API 1149 "Pipeline Variable Uncertainties and Their Effects on Leak Detectability"

- Flexible but “Fit for Purpose” and able to factor Operator Considerations
- Considers various Risks/environmental impact
- Performance Requirements
  - Reliability
  - Repeatability
  - Robustness
  - Sensitivity
  - Accuracy

The project must transition from the core R&D phase into conducting field validation phase that verifies the viability of gas/liquid leak detection and quantification technologies and methodologies to the established framework. The core effort should be developed within 12-24 months with the validation studies modified to the original contract should take another 12-24 months to field test several leak detection systems. There are some aspects that may make sense to be done in parallel or results from the validation portion fed back into modifications to the framework as part of a continuous process improvement loop.

#### Anomaly Detection & Characterization

#### **General Knowledge - Improving Non-Destructive Evaluation (NDE) Performance/Reliability Through Reducing Human Effects on NDE Measurement Systems.**

A project must study how human factors can influence NDE data collected in the ditch. A project could work with multiple technology vendors to review procedures so that a number of decision points are identified that are situations where human interactions can have major impacts on collected data. The project results will aid in identifying key points where technology service providers, pipeline operators or even regulators can engineer solutions that exclude or manage human role as much as possible. This project must utilize recommendations from a Technical Advisory Committee comprised of regulators, liquid and gas pipeline operators, technology service providers that are involved with the project and notable subject matter experts. Solutions to the market should be planned for 18-36 months depending on the level of vendor involvement.

#### Materials

#### **Consensus Standard and General Knowledge – Development of Comprehensive Pressure Test Design Guidelines**

A project must develop general public guidelines for a comprehensive pressure test design that focus on reliability, spike tests, destructive/damage, integration of inspection data (etc.). Key considerations/ questions for the pressure test design guidelines could address how the test procedures should be different for different pipe types, how reliable should test results be for which flaw type, how much consideration should be incorporated from other industry sources,

how can In-Line Inspection play to validate tests and what type of destructive impacts of pressure testing (i.e. from above yield, dormant features, NDE measurements) should be anticipated. In addition, two active research projects funded by PHMSA have related information that must be factored into any proposed effort. They are listed below where the related reporting is publically available or will be provided upon award. Partnerships are also welcomed with both research company leads. The project results should be formatted in a style that supports coordination with Standards Developing Orgs. (SDO) Project scope should work around consolidating industry knowledge and develop guidelines. The results should be applicable to all pipeline types in all operating environments. This project must utilize recommendations from a Technical Advisory Committee comprised of regulators, liquid and gas pipeline operators, hydrotest service providers, most relevant SDOs and notable subject matter experts. Results are needed as soon as possible but 12-36 months is realistic for full uptake.

Related Project #1 - Repair/Replacement Considerations for Pre-Regulation Pipe

<https://primis.phmsa.dot.gov/matrix/PrjHome.rdm?prj=559>

Related Project #2 - Comprehensive Study to Understand Longitudinal ERW Seam Failures

<https://primis.phmsa.dot.gov/matrix/PrjHome.rdm?prj=390>

Project #2 Related Reporting

1. Effectiveness of Hydrostatic Testing for Assessing the Integrity of ERW and Flash-weld Pipe Seams
2. Predicting Times to Failure for ERW Seam Defects that Grow by Pressure-Cycle-Induced Fatigue
3. Task 3.2 – Selective Seam Weld Corrosion Test Method Development
4. Task 4.1 Compare - Contrast Analysis of Inspection Data and Failure Predictions versus Burst-Test Outcomes for ERW-Seam Defects

*General Knowledge/Model - Evaluation of Corroded Cast Iron Pipe*

A project must develop/strengthen methodologies to characterize the structural significance of graphitic corrosion in cast iron pipes. The methodology or model should be fitness for service based upon graphitization and loss of effective wall thickness, should factor among many loads the impact from frost heave on the pipe and its connections and should evaluate the long term or remaining strength of the pipe in support of prioritizing pipe replacement programs. The project should consider how the pipe or connections must be accessed in a congested urban environment, load differences between in-service or not in service and a focus with non-destructive evaluations. This project must utilize recommendations from a Technical Advisory Committee comprised of regulators, gas distribution pipeline operators and notable subject matter experts. The anticipated timeframe for project results is 24 months.

## ***Consensus Standard and General Knowledge - Slow Crack Growth Evaluation of Vintage Polyethylene Pipes***

A project must develop guidelines for direct evaluation of slow crack growth for vintage polyethylene pipes such as Aldyl-A. PHMSA Advisory Notice [ADB-07-01](#) should be reviewed with proposed guidelines factor fitness for service considerations, finite element methods and the utility of pressure testing in support of replacement prioritization. The project should consider in ditch condition assessment and how the pipe must be accessed in a congested urban environment. This project must utilize recommendations from a Technical Advisory Committee comprised of regulators, gas distribution pipeline operators and notable subject matter experts. The anticipated timeframe for project results is 24 months.

## ***General Knowledge – Engineering Critical Assessment of Cured in Place Pipe Liners at Bends, Valves and Service Taps***

A project must follow on from the efforts of two ongoing research projects that are investigating the integrity of cured-in-place pipe (CIPP) liners and their interaction with the host pipe to demonstrate their capability to carry the loads when a host pipe is degraded. The project must move beyond just the liners and host pipe to the liners and their interaction with the host pipe at bends, valves, service taps and other complex configurations in order to demonstrate liner capability to carry the loads when the host pipe is degraded or such as when the liner is tapped. The assessment must focus on the reliability and long-term integrity of not just the liner. Rather the entire newly formed pipe system. Project scope should work around consolidating industry knowledge in developing the guidelines.

This project must utilize recommendations from a Technical Advisory Committee comprised of state regulators, gas distribution pipeline operators and notable subject matter experts. The anticipated timeframe for project results is 24 months.

Related Project #1 –Evaluation of Structural Liners for the Rehabilitation of Liquid and natural Gas piping Systems

<https://primis.phmsa.dot.gov/matrix/PrjHome.rdm?prj=501>

Related Project # 2 – Technology Transfer, Demonstration and Post-Mortem Testing of Cast Iron and Steel Pipe Lined with Cured-in-Place Pipe Liners.

<https://primis.phmsa.dot.gov/matrix/PrjHome.rdm?prj=502>

## Risk Models

### **General Knowledge - Paper Study on a Critical Review of Candidate Models**

The study must consider where relevant the guiding principles and major/minor areas of model improvement identified in the report out slides #3-7 from Working Group #4 Improving Risk Models. The study more specifically should consider the following details:

- Candidate models from inside/outside the pipeline industry
- Ability to predict previous events from candidate models
- Suitability to pipelines and its operational, regulatory and business realities
- Decision theory to optimize risk
- Commentary on other facilities and LNG

This project must utilize recommendations from a Technical Advisory Committee comprised of regulators, liquid and gas pipeline operators, most relevant SDOs and notable subject matter experts. Contractors may be contractually directed to coordinate research efforts between the topics addressing risk models. Results should be delivered in 8-12 months.

### **General Knowledge - Paper Study on Review of Approaches for Preventing Catastrophic Events**

The study must consider where relevant the guiding principles and major/minor areas of model improvement identified in the report out slides #3-7 from Working Group #4 Improving Risk Models. The study more specifically should consider the following details:

- How other industry approaches could be adapted to the pipeline industry
- Consider how to facilitate unique data mining
- Suggestions for a Knowledge Management Framework so that lessons learned are propagated back in to the community of knowledge

This project must utilize recommendations from a Technical Advisory Committee comprised of regulators, liquid and gas pipeline operators, most relevant SDOs and notable subject matter experts. Contractors may be contractually directed to coordinate research efforts between the topics addressing risk models. Results should be delivered in 8-12 months.

### **General Knowledge - Paper Study on Risk Tolerance**

The study must consider where relevant the guiding principles and major/minor areas of model improvement identified in the report out slides #3-7 from Working Group #4 Improving Risk Models. The study more specifically should consider the following details:

- Conflicts between non-zero risk and the goal of zero failures
- Survey across other industries/geographies to understand how risk tolerance is determined/quantified

This project must utilize recommendations from a Technical Advisory Committee comprised of regulators, liquid and gas pipeline operators, most relevant SDOs and notable subject matter experts. Contractors may be contractually directed to coordinate research efforts between the topics addressing risk models. Results should be delivered in 8-12 months.

## LNG

### ***General Knowledge - Statistical Review and Gap Analysis of Data Currently Underlying PHMSA's LNG Failure Rate Table and Methodology***

The Liquefied Natural Gas (LNG) Failure Rate Data currently being applied by PHMSA were selected using a methodology such as summarized in "U.S. Regulatory Framework and Guidance for Siting Liquefied Natural Gas Facilities – A Lifecycle Approach" by Andrew Kohout of Federal Energy Regulatory Commission (FERC)<sup>1</sup>. This methodology was "to provide conservative and consistent trends failure rates among the various types of failures with recognition that improved and updated failure rate data may be used pending review and acceptance of [sic] FERC and PHMSA". The current "conservative" LNG Failure Rate Data can sometimes result in taller or longer vapor fences than would have been required under previous PHMSA rules. These vapor fences can increase safety concerns due to higher in-plant flammable concentrations. An additional concern is that only limited failure rate data specific to U.S. LNG plants has been gathered since a major survey completed in 1981. Some LNG plant design practices have changed since 1981, possibly making some failure rate data less suitable for newly-designed LNG plants.

The project scope must perform a state-of-the-art statistical review and gap analysis of the data that currently underlies PHMSA's current LNG Failure Rate Table, as well as other existing data that may inform PHMSA's LNG Failure Rate Table. This review and analysis should apply a hybrid causal model methodology to the interacting threats in a modern LNG facility. A preliminary risk and sensitivity analysis should be conducted on the basis of this model that should consider factors such as: failure modes; the effect of historic changes in the design of LNG facilities, piping systems and equipment; environmental factors; and conditional likelihoods of failures. Preliminary probability distributions should be developed from the relevant existing data for each plant component based on fundamental influencing factors, which may include for example: reference pipe length; LNG-specific vs. other chemical plant failure data; export vs. peak-shaving plant data; age of data; and presence of expansion joints. A Bayesian methodology may be one example of the type of risk analysis methodologies utilized.

In addition, related data development efforts should include a comprehensive Literature Review to identify any additional key data that should inform a LNG Failure Rate Data analysis but that

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1. <sup>1</sup> Kohout A. "U.S. Regulatory Framework and Guidance for Siting Liquefied Natural Gas Facilities – A Lifecycle Approach." Proceedings of Mary Kay O'Connor Process Safety Center, 15th International Symposium, College Station, Texas, 2012.

was not considered in the methodology summarized by FERC. Data analysis efforts should include identifying those items in the LNG Failure Rate Data for which the available data is very limited and for which additional data would be particularly advantageous in order to increase statistical confidence levels.

#### Deliverables:

There are individual deliverables identified for this project that are in addition to the standard PHMSA monthly/quarterly/final reporting for this project. The individual reporting must include the following:

- A summary of the statistical review and gap analysis of the available data that can inform PHMSA's LNG Failure Rate Data, including the basis of PHMSA/FERC's baseline threshold failure rate criterion of  $5E-5$  to  $3E-5$  failures per year (by analyzing the underlying data and the origin of this basis in a manner such as described above). In addition, a preliminary recommendation to retain or modify this baseline rate shall be developed based on this statistical review and analysis of the scientific data.
- Graphical summaries of the existing data set for each component, including preliminary probability distributions and confidence intervals, analyzed by fundamental influencing factors.
- Identification of those components in the LNG Failure Rate Data for which the available data is very limited and for which additional data would be particularly advantageous in order to increase statistical confidence levels. Create a robust failure rate database for use in loss of containment (LOC) or design spill events in LNG facilities
- Collect data from reputable sources; evaluate and refine the data to produce a failure rate database. As necessary, develop engineering estimates for use where data does not exist. The equipment types should include process piping, transfer piping (if different from process piping), pipe-in-pipe systems, pressure vessels, pumps, compressors, valves, heat exchangers, filters, flanged connections, instrumentation, marine transfer arms, flexible connections, and other equipment as deemed necessary. The analysis may also include definition of failure modes for each equipment type.
- A complete bibliography of referenced data, based on the results of the Literature Review.
- Recommendations for research subsequent to this review and analysis that can further inform specific recommended future changes to PHMSA's LNG Failure Rate Table. Such recommendations may include for example:
  - Gather additional key LNG Failure Rate Data by directly contacting U.S. LNG plants, terminals and facilities, and then incorporate the new LNG failure rate data in the statistical analysis outlined above.
  - Perform more extensive analysis and modeling for the "weakest links" (i.e. failures for which there is the least amount or quality of data, highest expected failure rates, worst consequences, and/or other indications); this could rely on existing models (as summarized in the Literature Review) or on new modeling efforts, using both computer simulations and laboratory studies.

- Perform further sensitivity analysis to assess the impact of varying probability distributions on PHMSA's specified LNG Failure Rate Data for various plant components and configurations.

It is estimated that the project should take 12-18 months to complete given this is a high priority for decision makers.

### *General Knowledge – Development of LNG Substrate Heat Transfer Properties*

A project must develop heat transfer properties for various substrates (i.e. various concrete mixtures, stone, earth, insulated materials, others) that may be used in Liquefied Natural Gas (LNG) impoundment or drainage trench applications. The project must define, engineer, and test drainage trenches and impoundments in a way that the vaporization of a cryogenic material spill can be measured. This does involve field-scale testing, but could easily be done with liquid nitrogen (instead of LNG) to reduce the hazards. A test plan with engineering background and a test site will be required and developed in partnership with PHMSA. This project is anticipated to require up to 24 months for developing, constructing, executing testing, evaluating and reporting on the findings.

### *General Knowledge - Comparison of Various Exclusion Zone Calculations and Vapor Dispersion Modeling Tools*

The project must compare the various design spill selection methodologies and to compare the exclusion zone results for various facility types. The comparison must also include a review of the rigor of how various vapor dispersion modeling tools commercially available address the methodologies and recommendations from this project. In particular, the project must evaluate several design spill selection methodologies and apply them to import, export, peak-shaving, and mid-size truck loading Liquefied Natural Gas plants. Evaluate the various computer modeling tools for vapor dispersion. In addition to the standard PHMSA monthly/quarterly/final reporting for this project, a summary final presentation file is required. This project is anticipated to require four to six months.

### **White Paper Requirements**

PHMSA is seeking white papers on individual projects and/or consolidated R&D programs addressing the pipeline safety program areas presented in this solicitation.

Submissions under this Research Announcement must produce an output which addresses one or more of these three specific objectives.

1. Collaborative development of new technology;
2. Strengthening of industry consensus standards and /or;
3. Generation and promotion of new knowledge.

The research team members should strive to include, where applicable, other relevant government agencies, technology developers, trade organizations, service providers, pipeline operators and, if appropriate, standards development organizations. These measures raise confidence that proposed research will achieve desired objectives and assist the merit review panel in evaluating submissions. White papers should identify what benefit/result the research will have and who is partnering on the project to achieve the desired aim.

A consolidated R&D program white paper from a team's lead organization should identify opportunities for integrated R&D that will involve contributions from several organizations whose combined expertise will contribute greater efficiency and effectiveness to R&D in the proposed program areas. Double submissions will not be accepted; your white paper must specify either individual or consolidated project(s).

Merit review panels may determine at the full proposal evaluation phase, if consolidated programs should be broken into individual projects. Researchers may not submit individual projects both as an individual project and part of a consolidated program at the white paper phase.

PHMSA believes measuring research results and impacts are paramount to the future sustainability of its Pipeline Safety R&D Program. Researchers must keep this goal in mind when developing white papers and later with full proposals if solicited. The following bullets are recommended guidelines in proposing a project.

- All proposed research must include work scope (if applicable) addressing data generation, quantity, quality, and standardization.
- A new assessment process or technology is creating terabytes of data. Proposed research should clearly address what kind of data is created, who are users of the data, what quality control and assurance of data exist.
- All white papers should identify all Standard Development Organizations and or Government/Industry Organizations to use the data developed under proposed work and where or how it will be presented and maintained.
- Consolidated R&D Programs require a single white paper submitted by a program team's lead organization and must clearly identify how the projects within the program address the program goal. The project level R&D can be integrated from one or more researchers.
- The consolidated program structure should be presented in a flowchart and the combined expertise must contribute greater efficiency and effectiveness than individual projects to PHMSA R&D objectives in the proposed program areas.
- The merit review panel must clearly understand the consolidated structure to effectively use the consolidated review criteria identified in this solicitation.
- Researchers must assist in identifying specific performance metrics on research addressing technology development. PHMSA and co-sponsors must convey the story of our collaborative R&D to leaders in government and industry to sustain the level of future research. Metrics can be quantitative and qualitative in nature. Some examples of good metrics are illustrating how much better technology is detecting or characterizing defects or in how much time or money is saved.

If a white paper reaches the full proposal stage, the full proposal must include cost sharing contributions in accordance with the guidelines that will be conveyed in full proposal request letters.

Each white paper must include the following contact information: point of contact, organization name and complete street address, organization DUNS number, organization Tax Identification Number (TIN), telephone number, fax number, and email address.

White papers are not to exceed five (5) pages (not including a title page). The information the merit review panel will use to evaluate white papers must be contained within the 5 pages using 1 inch margins all around and 12 point Arial or Times New Roman font. If desired, white papers may include attachments, appendices, and backup materials in addition to the 5 page limit, as just an FYI for reviewers.

PHMSA will consider all applications exceeding the core 5 page (not including a title page) limitation as NON-RESPONSIVE. Non-responsive applications will not be provided to the merit review panel and will be removed from consideration.

## **Evaluation**

An interested party must address the selection criteria by providing sufficient information and by keeping the entire paper within the five (5) page limit. Specifics on the selection criteria are as follows and only for the White Paper stage. If recommended to compete further, the selection criteria will be communicated in the Request for Proposal Letter:

1. Relevance to PHMSA's mission and state of understanding.
  - Is the white paper relevant to PHMSA's mission of safety and/or environmental protection?
  - How well does the white paper describe the challenge and/or state how the approach will resolve the challenge?
  - Does the white paper describe related work done by others, status of any related technology developments or consensus standard revision done by others?
2. Soundness of Project or Program design and implementation.
  - How well are project/program goals or objectives defined?
  - Does the scope of work, tasks, and milestones support the goals and objectives?
  - How likely would this project be successful if awarded?
3. Coordination and collaboration of work scopes and deliverables.
  - Does the white paper identify the deliverable type (i.e. technology development or standard development or general knowledge)?
  - Does the white paper identify who would use research results (i.e. end users)?
  - Does the white paper involve end users of the deliverable type into the work scope?
  - How much discussion is provided whether the deliverable or output satisfies a current challenge or are additional tasks necessary before completion of project?

All evaluation factors are of equal importance.

A technical merit review panel will only review white papers that address topics in this solicitation and meet document guidelines. An offeror providing a white paper deemed worthy of further consideration and meeting the criteria of this solicitation may be notified with possible suggestions for minor changes in scope and detailed guidelines for submitting a full proposal for either individual or consolidated proposals, but not both.

Upon receipt of full proposals, the merit review panel will again evaluate the proposal using an expanded set of criteria that will be communicated in the Request for Proposal Letter.

A white paper only needs to include a "ballpark" cost estimate including workforce and resource sharing breakdown (depending on which funding strategy the project is listed under). A full proposal must include detailed resource sharing contribution documentation including cost analysis and certified letters of commitment from project or program participants. Allowable resource sharing contributions where applicable are cash or in-kind. Additional details outlining the allowable resource sharing contributions will be made available to successful respondents that are invited to participate in the full proposal stage of this solicitation.

### **How to Submit White Papers**

This FedBizOps notice constitutes the solicitation as contemplated by FAR 6.102(d)(2). A formal Request for Proposal (RFP) or other type of solicitation regarding this announcement will not be issued.

The procedure for submitting a white paper is as follows:

- 1) Prior to submitting a White Paper, each organization must first complete an online Registration Form ([LINK](#)) to access PRIMIS. Credentials from past registration will still be valid. For questions or problems with the Registration or Application of the Web Site, please submit an email to [rdsupport @ cyclac.com](mailto:rdsupport@cyclac.com).
- 2) Submit white paper electronically; only electronic submissions will be accepted. Additional instructions regarding the preparation and electronic submission of the White Papers along with individual questions and answers are available on the website identified above. White Papers must be uploaded by 5:00 P.M. EST, 11/17/2014. Submitted white papers remain the property of PHMSA.

Upon receipt of appropriations, PHMSA anticipates making multiple awards for individual and consolidated research projects. The mechanism for all awards will be fixed price type "Other Transaction Agreements." It is expected that total funding for awards resulting from this RA is estimated to be \$10,000,000. Payments will be made not more often than quarterly and will be based on work completed (and approved by the Government) under the fixed price task. Additional details will be provided in the full proposal request letter.

Any questions are to be directed to the PHMSA Office of Acquisition Services as listed in this solicitation. Any questions on solicitation content, issues, or procedures must be submitted via email to Ben Patterson (Contract Specialist) at [ben.patterson@dot.gov](mailto:ben.patterson@dot.gov) with a copy to Mr. Warren Osterberg (Senior Contracting Officer) at [warren.osterberg@dot.gov](mailto:warren.osterberg@dot.gov), and with DTPH5615RA00001 in the subject line. PHMSA encourages the widest participation, particularly involvement with universities and other academic institutions, as well as with individuals, corporations, non-profit organizations, small and small disadvantaged businesses, and State or local governments or other entities.

F E N V A L