

**COOPERATIVE AGREEMENT**  
No. OASRTRS-14-H-UVM

BETWEEN

The University of Vermont and State Agricultural College  
85 S. Prospect Street, Burlington, VT 05405-0160

AND

U.S. DEPARTMENT OF TRANSPORTATION  
OFFICE OF THE ASSISTANT SECRETARY FOR RESEARCH AND TECHNOLOGY

FOR

**Unmanned Aerial Systems for Transportation Decision Support**

Total Amount of Agreement: **\$468,126**

Total Estimated Federal Government Funding of the Agreement: **\$234,063**

Total Estimated Recipient Cost-Share: **\$234,063**

Appropriation Data:

AUTHORITY: This agreement is entered into between the U.S. Department of Transportation (USDOT), represented by the Office of the Assistant Secretary for Research and Technology (OST-R), and The University of Vermont and State Agricultural College (UVM), DUNS: **06-681-1191**, Taxpayer ID#: **03-0179440**, pursuant to and under the authority of Section 7301 of P.L. 109-59; the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

University of Vermont and State  
Agricultural College

U.S. DEPARTMENT OF TRANSPORTATION  
OFFICE OF THE ASSISTANT SECRETARY FOR  
RESEARCH AND TECHNOLOGY

\_\_\_\_\_  
Signature  
Jennifer Gagnon,  
Associate Vice President for Research  
Administration

\_\_\_\_\_  
Signature  
Gregory Winfree, Assistant Secretary for Research and  
Technology

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

\_\_\_\_\_  
Effective Date

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## AGREEMENT ARTICLES

### 1. INVOLVEMENT STATEMENT

Substantial involvement is anticipated between the Office of the Assistant Secretary for Research and Technology (OST-R) (Government) and The University of Vermont and State Agricultural College (Recipient) through the terms of this Cooperative Agreement. In supporting the Cooperative Agreement, the USDOT /OST-R is assisting the Recipient to put forth the recipient's best efforts to design and develop **Transportation Decision Support Tools which promises to extend the available Commercial Remote Sensing & Spatial Information tools to enhance State and Local Transportation Agencies Operations**. The goal of this sixth phase research is **to address the needs of state and local transportation agencies by commercialization of the technology in these specific focus areas geomorphic assessment, construction management and phasing, resource allocation during disaster response, and cost decision support during disaster response**. The research team includes the following key persons:

Jarlath O'Neil-Dunne – University of Vermont

USDOT/OST-R has designated Mr. Caesar Singh as the Program Manager (PM) to facilitate technical assistance, to negotiate, administer and execute all business functions, to coordinate schedules, deliveries, and exchange of materials with the Recipient, and to resolve questions concerning technical as well as financial matters and procedures of this agreement.

### 2. SCOPE/STATEMENT OF WORK

USDOT/OST-R is responsible for implementing the Commercial Remote Sensing and Spatial Information (CRS&SI) technology program. This includes the delivery of validated products for new applications to transportation infrastructure planning and construction, as required under Section 5506 of Public Law 109-59, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The purpose of this Cooperative Agreement is **for The University of Vermont and State Agricultural College** to assist USDOT/OST-R in this endeavor.

Under the terms of this agreement, **The University of Vermont and State Agricultural College** will assist OST-R with the following tasks. Project deliverables are listed by their deliverable ID, which can be found in attachment 1:

#### **1. Project coordination**

##### Task description

The supervision, scheduling, and phasing of personnel and resources associated with the project.

##### Outputs/deliverables

Finalized project timeline, acquisition of equipment and needed supplies and relay of

project team effort to team members.

## 2. **Reporting**

### Task description

Activities related to reporting progress and results to the funding agency including quarterly reports and final reports, all submitted to DOT

### Outputs/deliverables (D2, D12)

- White Papers
- Quarterly reports, draft and final reports
- Revised project activities and deliverables as needed.

## 3. **Stakeholder/partnership meetings**

### Task description

Establish the advisory committee and carry out meetings with external groups and collaborators, including state transportation departments, industry partners, and the advisory committee. Meetings include: project kick-off, advisory committee updates, meetings with local/state transportation agency personnel, selection of UAS flight sites, industry/commercial integration partner meetings, and stakeholder decision support feedback. The committee will review project progress and provide guidance throughout the life of the project.

### Outputs/deliverables (D1)

- Advisory board of transportation agencies members and subject matter experts.
- Meeting notes.

## 4. **UAS operations**

### Task description

Planning, data acquisition, and data processing associated with UAS operations. Flight planning consists of establishing the flight using eMotion software, obtaining flight approval, updating and completing flight and equipment checklists, updating and following operating procedures, flight operations, and after-action reports. UAS operations will be conducted for the four categorical areas of this project: a) geomorphic assessment, b) construction management and phasing, c) resource allocation, and d) cost decision support. For geomorphic assessment UAS data will be collected for several high priority streams or rivers. The UAS data will support updating stream geomorphic assessments and hydrologic models. For the construction management and phasing focus area, UAS data will be collected to facilitate the creation of decision support products for transportation construction projects that transportation planners have identified as requiring monitoring and assessment. For both the resource allocation and cost decision support focus areas, UAS data will be collected over portions of a transportation network affected by a natural disaster. In support of all the categorical areas we will establish protocols and procedures for integrated UAS collection operations. Integrated operations use more than one UAS to cover a large area and offer the potential to overcome the range limitations inherent to lightweight UAS. Guiding documentation for integrated UAS operations will be for developed and refined.

### Outputs/deliverables (D3, D4, D5)

- Flight plans.
- UAS operating guidelines to include a UAS equipment checklist, UAS flight checklist, UAS operating procedures and manual.

## 5. **Decision support tools.**

### Task description

Decision support tools to support the four categorical areas. Specific task details for each of the four categorical areas are as follows.

*Geomorphic assessment.* Decision support tools for geomorphic assessment will focus on the development and validation of using UAS data and associated tools to assess change in a hydrologic network and update geomorphic assessments and hydrologic models. Orthophoto mosaics and 3D point clouds will be generated from the UAS data using image cost matching techniques. The 3D point clouds will then be converted into a raster Digital Surface Model (DSM). The DSM will serve as the basis for computing flow direction, which will then be subsequently used to derive flow accumulation. Raster thresholding will be employed in conjunction with manual interpretation to extract the hydrologic network. Cross section analysis tools will be developed to compare existing stream profiles to those obtained from the UAS data and morphological change will be computed for the stream thalweg. The Stream Geomorphic Assessment Protocols will then be applied to the data to compute stream segments, upslope contributing area, and channel width. Updated geomorphic assessment information will be summarized in a report. UAS data and spatial hydrologic datasets will be provided to state transportation agencies for the purposes of updating GIS-based hydrologic models. Comparisons will be carried out with recent field-based geomorphic assessments to understand the advantages and disadvantages of using UAS data for geomorphic assessment.

*Construction management and phasing.* UAS data and associated decision support tools will be developed to support construction management and phasing. A specific emphasis will be put on generating high-temporal resolution datasets that facilitate the visualization, tracking, and management associated with long-term construction projects and developing web-based and mobile tools to harness these datasets. Orthophoto mosaics and 3D point clouds will be generated from the UAS data using image cost matching techniques. 2D and 3D static visualization products will be generated to provide updates on the construction status. 2D orthophoto mosaics will be integrated into the Vermont Agency of Transportation's GIS to enable multi-temporal visualization. An online web mapping application, using MapBox® technology will be designed, developed and deployed to facilitate the visualization of the orthophoto mosaics over the course of the project. A mobile device asset management tool using the Fulcrum® application will be designed, developed, and deployed to provide access to the UAS data when conducting on-site construction phase verification using both connected (mobile network accessible) and disconnected (mobile network not accessible) modes.

*Resource allocation.* Decision support for resource allocation will center of determining the location and extent of damage to a transportation network using UAS data, disseminating UAS products to managers, and assessing the capabilities and limitations of UAS data and products compared to traditional approaches. Rapid image chip

products containing raw UAS imagery will be generated upon UAS landing. Orthophotos from the UAS data will be produced using cost image matching techniques. The rapid image chips and orthophotos will be exploited to assess damage and identify staging areas. The cost benefit of rapid image chip exploitation versus orthorectified image exploitation in terms of time and accuracy will be assessed. The types of resources that can and cannot be allocated using UAS data products will be determined. The optimal approach for compressing UAS data then transmitting these data from the field across WiMax and mobile cellular networks to the incident command center will be established. The applicability for using purchasing decisions for materials using remotely sensed data will be evaluated. Finally, steps for integrating UAS data into the National Incident Management System (NIMS) at the “resource” and “recovery” phases will be developed.

*Cost decision support.* The fill volume estimation tool developed as part of RITARS-12-H-UVM will be enhanced so that in addition to providing fill estimates it also provides information on overall cost to repair portions of the transportation infrastructure following events such as flooding and erosion. Historical data on the cost of fill needed to repair washed-out roads resulting from flooding will be compiled. The relationship between the volume of road washed out and the fill cost will be determined. The fill estimation tool developed in RITARS-12-H-UVM will be updated to predict the cost of fill needed to repair the roads. Model savings associated with making more rapid decisions using UAS data as opposed to traditional approaches will be computed. A web-based mapping portal to disseminate information will be developed.

#### Outputs/deliverables (D8)

##### *Geomorphic assessment*

- 2D orthophoto mosaics
- 3D point clouds
- Updated hydrologic network in GIS format
- Stream cross sections and morphological change
- Geomorphic assessment report
- Comparison of UAS-based geomorphic assessment to field-based ones.

##### *Construction management and phasing*

- 2D orthophoto mosaics
- 3D point clouds
- GeoPDF visualization products
- Web-based multi-temporal mapping portal
- Mobile construction phasing assessment tool

##### *Resource allocation*

- KML image chip files
- 2D compressed orthophoto mosaics
- Best practices/NIMS integration white paper

##### *Cost decision support*

- Updated fill estimation/cost estimation tool
- Web-based mapping portal

## 6. Training and outreach

### Task description

Hosted workshop and online “virtual campus” tutorials and data. Training data will be assembled from the missions conducted in task 4. Three videos will be produced to UAS decision support tools. A training manual will be compiled for the workshop. A workshop on UAS decision support tools will be given in UVM’s geospatial teaching facility and feedback from attendees will be gathered. All materials will be posted online for universal access.

### Outputs/deliverables (D7)

- Workshop on UAS products for transportation decision support.
- Online training materials including videos, sample data, and step-by-step manuals.

## 7. Publications/presentations.

### Task description

Documentation of the project and its results in conference/journal publications and conference presentations. Development of training and operational materials for dissemination to stakeholders.

### Outputs/deliverables (D9, D10)

- A paper submitted to a conference or peer-reviewed journal.
- A conference presentation of the results.

## 8. Business plan development.

### Task description

Cost accounting to support the development of a business plan to enable UAS services to be offered to state and local transportation agencies once the RITA project has come to a conclusion.

### Outputs/deliverables (D11)

- Business plan to include Cost Accounting, Rate Calculations, Market Analysis and Plan, Management Team, and Revenue Projections.

## 3. TERM OF THE COOPERATIVE AGREEMENT

This Cooperative Agreement is valid for a period of twenty two (22) months from the effective date, except as otherwise provided under 49 CFR, Part 19, Subpart C Post Award Requirements, Section 19.62, Enforcement, and Section 19.61, Termination. As noted above Section 19.25, Revision of Budget & Program Plans, the Agreement may be extended for additional periods pending successful completion of previous project tasks, perceived program needs and availability of funds.

The total value of this agreement is **468,126**. OST-R will provide **234,063** to support the project

as described in this agreement. Recipient's proposed cost share amount for the project is **234,063**.

Any modifications including no cost extensions as well as technical or financial changes to this Cooperative Agreement must be in writing and signed by both the Recipient and the Program Manager.

Material compliance of this Cooperative Agreement consists of the following items:

- Successful & timely completion of all tasks, deliverables, activities and milestones proposed as per the revised full technical proposal submitted on **September 11, 2014**, and described in Attachment 1, "Team Project Activities," Attachment 2, "Project Deliverables," and Attachment 3, "Technical and Deliverable Milestone Schedule".
- Strict & satisfactory adherence to Labor hours for all staff categories as per the revised cost proposal submitted on **September 22, 2014**, and the Principal Investigator shall be responsible for ensuring the compliance.

#### **4. DELINEATION OF TASKS**

The Recipient is responsible for performing the tasks and deliverables associated with those tasks as identified in Section 2, above, and in Attachments 1, 2, and 3 of this agreement. The Recipient's approach for carrying out these tasks is described in its Technical and Staffing Proposal dated **September 11, 2014**, and in the Recipient's revised Cost Proposal, dated **September 22, 2014**, which is incorporated into this agreement by reference. Attachment 1, "Team Project Activities," Attachment 2, "Project Deliverables," and Attachment 3, "Technical and Deliverable Milestone Schedule," are also incorporated into this Agreement.

#### **5. PROJECT OFFICIALS**

**Program Manager (PM)** - The Program Manager (PM), **Mr. Caesar Singh**, will monitor the work under this Cooperative Agreement and will oversee the technical administration of this Cooperative Agreement and act as technical liaison with the performing organization. In addition, the PM has full authority to negotiate, administer and execute all business matters of this Cooperative Agreement. Further, should any changes to the scope, budget, schedule or any other terms of the agreement become necessary, only the PM has the authority to amend the Cooperative Agreement.

**Principal Investigator (PI)** - The Principal Investigator (PI) is the individual, designated by the Recipient and approved by USDOT/ OST-R, who is responsible for the technical direction of the project. The PI cannot be changed or become substantially less involved than was indicated in the Recipient's proposal, without the PM's prior written approval. The PI assigned to this Agreement is **Jarlath O'Neil-Dunne**.



## **6. CONSIDERATION AND PAYMENT**

### **A. Request for Reimbursement**

Reimbursable Payments will be made, on a quarterly basis, after receipt of a Request for Advance or Reimbursement, SF-270, acceptable to USDOT. Each voucher must show the Cooperative Agreement number, cost for billing period, and costs to date.

**NOTE:** Payments to the Recipient will be made to reimburse expenses reasonably, allocably and allowably incurred in the performance of this Cooperative Agreement. USDOT does not plan to make any advance payments to the Recipient. The timing of payments will be as close as is administratively feasible to actual disbursements.

OST-R Grantees are required to request reimbursable payments by submitting SF-270 forms electronically via the recently implemented Delphi eInvoicing System within USDOT. Information about the new system along with web-based training and can be found at <http://www.dot.gov/cfo/delphi-einvoicing-system.html>.

The Recipient must submit a copy of all requests for reimbursable payments to the Government office below:

U.S. Department of Transportation  
Office of the Assistant Secretary for Research and Technology (OST-R)  
1200 New Jersey Avenue, S.E., Room # E33-467  
Washington, DC 20590  
ATTN: Mr. Vasanth Ganesan  
PH: (202) 366-0623                      e-mail: [vasanth.ganesan.ctr@dot.gov](mailto:vasanth.ganesan.ctr@dot.gov)  
FAX: (202) 366-3671

### **B. Approved Project Proposal/Budget**

The Recipient's approved proposal/application entitled, **Unmanned Aerial Systems for Transportation Decision Support** and accompanying Project Budget, SF 424 and SF424A, as finally revised on **September 11, 2014**, is incorporated into and made a part of this Cooperative Agreement. (SF 424 Series of forms are incorporated by reference). Any reallocation of funds is governed by and subject to 49 CFR, Part 19, Subpart C Post-Award Requirements, Section 19.25, Revision of Budget and Program Plans."

### **C. Payment of Reimbursement**

**NOTE:** The Recipient must be registered in the Central Contractor Registration (CCR) to receive payment on its invoices. For information on how to register, log on to [www.ccr.gov](http://www.ccr.gov).

#### (a) Method of Payment.

(1) All payments by the Government under this agreement will be made by electronic funds transfer (EFT), except as provided in paragraph (a) (2) of this clause. As used in this clause, the

term “EFT” refers to the funds transfer and may also include the payment information transfer.

(2) If the Government is unable to release one or more payments by EFT, the Recipient agrees to either—

- (i) Accept payment by check or some other mutually agreeable method of payment; or
- (ii) Request the Government to extend the payment due date until such time as the Government can make payment by EFT (but see paragraph (d) of this clause).

(b) Recipient’s EFT Information. The Government will make payment to the Recipient using the EFT information contained in the CCR database. If the EFT information changes, the Recipient is responsible for providing the updated information to the CCR database.

(c) Mechanisms for EFT Payment. The Government may make payment by EFT through either the Automated Clearing House (ACH) network, subject to the rules of the National Automated Clearing House Association or the Fedwire Transfer System. The rules governing Federal payments through the ACH are contained in 31 CFR Part 210.

(d) Suspension of Payment. If the Recipient’s EFT information in the CCR database is incorrect, the Government need not make payment to the Recipient under this agreement until correct EFT information is entered into the CCR database. Any invoice or agreement-financing request sent during this period will not be considered a proper invoice for the purpose of prompt payment under this agreement. The prompt payment terms of the agreement regarding notice of an improper invoice and delays in accrual of interest penalties apply.

(e) Recipient EFT Arrangements. If the Recipient has identified multiple payment receiving points (i.e., more than one remittance address and/or EFT information set) in the CCR database, and the Recipient has not notified the Government of the payment receiving point applicable to this agreement, the Government will make payment to the first payment receiving point (EFT information set or remittance address as applicable) listed in the CCR database.

(f) Liability for Uncompleted or Erroneous Transfers.

(1) If an uncompleted or erroneous transfer occurs because the Government used the Recipient’s EFT information incorrectly, the Government remains responsible for:

- (i) Making a correct payment;
- (ii) Paying any prompt payment penalty due; and
- (iii) Recovering any erroneously directed funds.

(2) If an uncompleted or erroneous transfer occurs because the Recipient’s EFT information was incorrect, or was revised within 30 days of Government release of the EFT payment transaction instruction to the Federal Reserve System, and—

(i) If the funds are no longer under the control of the payment office, the Government is deemed to have made payment and the Recipient is responsible for recovery of any erroneously directed funds; or

(ii) If the funds remain under the control of the payment office, the Government will not make payment, and the provisions of paragraph (d) of this clause apply.

(g) EFT and Prompt Payment. A payment is deemed to have been made in a timely manner in accordance with the prompt payment terms of this agreement if, in the EFT payment transaction instruction released to the Federal Reserve System, the date specified for settlement of the

payment is on or before the prompt payment due date and the specified payment date is a valid date under the rules of the Federal Reserve System.

(h) EFT and Assignment of Claims. If the Recipient assigns the proceeds of this agreement as provided for in the assignment of claims terms of the agreement, the Recipient must require as a condition of any such assignment that the assignee register in the CCR database and be paid by EFT in accordance with the terms of this clause. In all respects, the requirements of this clause apply to the assignee as if it were the Recipient. EFT information that shows the ultimate recipient of the transfer to be other than the Recipient, in the absence of a proper assignment of claims acceptable to the Government, is incorrect EFT information within the meaning of paragraph (d) of this clause.

(i) Liability for change of EFT Information by Financial Agent. The Government is not liable for errors resulting from changes to EFT information made by the Recipient's financial agent.

(j) Payment Information. The payment or disbursing office will forward to the Recipient available payment information that is suitable for the transmission as of the date of release of the EFT instruction to the Federal Reserve System. The Government may request the Recipient to designate a desired format and method(s) for delivery of payment information from a list of formats and methods the payment office is capable of executing. However, the Government does not guarantee that any particular format or method of delivery is available at any particular payment office and retains the latitude to use the format and delivery method most convenient to the Government. If the Government makes payment by check in accordance with paragraph (a) of this clause, the Government will mail the payment information to the remittance address contained in the CCR database.

#### **D. Funding and Funding Schedule**

(1) Resources provided by USDOT/OST-R to the Recipient under this agreement are required to be matched by the Recipient, in cash and/or in-kind, and from non-Federal sources, on at least a **100%** basis. That is, the Recipient (and / or the Recipient's sub-Recipients) must contribute to this project, from non-Federal sources, one dollar for every dollar that the USDOT pays to the Recipient. USDOT/OST-R will provide funds in the amount of **\$234,063** to support the Recipient for a two-year period beginning on the effective date of this Agreement. The Recipient's share of the fund matching and in-kind contributions for the two-year period shall be at least **\$234,063**. The Total Project Value (total Federal Price, plus total cost-share) is **\$468,126**.

The Recipient bears any cost overruns exceeding OST-R's share.

Funding in addition to the amount initially obligated (but never exceeding the agreed-upon total Federal price of this project) may be provided subject to availability of future appropriated funds and the successful completion of planned efforts.

(2) The Recipient is responsible for documenting and maintaining all cost sharing records for a period of three years after the expiration date of this agreement. The Recipient (and / or the sub-Recipients) will provide cost-sharing in an amount to at least match this project's Federal

funding requirement over the period of the award, in a flexible schedule of delivery that will accomplish the level of match proposed during the period of performance. The Recipient will track the matching with a dedicated accounting system. The Program Manager may request these detailed cost share records if further clarification for appropriateness is required.

(3) During the period of this agreement, the Recipient will match in cash and/or in-kind, on at least a **100% (dollar-for-dollar)** basis, any additional Federal funding USDOT provides.

Also, the recipient must satisfactorily meet the cost share requirements annually during this period.

## **7. REPORTS, REVIEWS, AND DELIVERABLES**

The following items will be applicable for the period of performance of the original awards & all subsequent extensions, if any:

### **A. Financial Reporting Requirements**

(1) The Recipient must submit an original and one copy of the Federal Financial Report (Standard Form 425) to report the status of funds for all non construction cooperative agreements. Each report is due 30 days after completion of each quarter of the project, except for the final Financial Status Report, which is due 90 days after projection completion. The report must be prepared in accordance with the instructions on the reverse side of the form. The Recipient must submit a check made payable to "U.S. Department of Transportation" for the unobligated balance of Federal funds remaining at the end of the project period (this report is subject to audit). All reports should be prepared on an accrual basis. If the Recipient's accounting records are not normally kept on the accrual basis, the Recipient is not required to convert its accounting system but must develop such information through best estimates based on an analysis of the documentation on hand.

(2) If this agreement provides for advances to Recipient, the Recipient must submit a Federal Cash Transaction Report (Standard Form 272) 15 working days following the end of each quarter.

(3) The Recipient must submit an original and one electronic copy of the reports to the PM - Refer to Section 7.C. of this Agreement.

### **B. Reports and Performance Review Requirements**

(1) **Quarterly Progress Reports.** The Recipient must submit a quarterly report, by the 15<sup>th</sup> calendar day after the end of each 3-month period, in electronic format, to the PM. Further details on requirements for this submission are shown in Attachment 2, Project Deliverables, and Attachment 3, Technical and Deliverable Milestone Schedule, to this Agreement. The report must address the following:

- Accomplishments. Provide a clear and complete account of work performed on each task and its relationship to task objectives and milestones;

- **Future Plans.** Discuss work planned for the next period and its relationship to the present period. Provide an outline of the work to be accomplished during the next report;
- **Problems Encountered.** Describe any problems encountered or anticipated that will affect the completion of the agreement within the time and fiscal constraints as set forth in the agreement, together with recommended solutions to such problems, or a statement that no problems were encountered;
- **Funds Expended and Program Schedule.** Highlight any changes to the schedule as previously reported and provide a tabulation of the planned, actual and cumulative labor-hours expended for the program along with a chart showing current and cumulative expenditures versus planned expenditures; and
- **Labor Hours.** Labor hours expended by task for all staff categories must be reported.

(2) **Bi-Annual Performance Reviews.** A Bi-Annual Review must be conducted six months of Agreement performance. The Recipient's Principal Investigator must make a presentation using visual aids, such as slides, view graphs, handouts, and any other graphic display that will aid the reviewer in understanding the status of the agreement performance. The presentation must cover the status of agreement tasks and deliverables and include a summary of the activity and the progress made during the past six months and the projected activity for the next six months. Any problems encountered will be addressed in the review.

The Bi-Annual review will also consist of a project status session that shall include, as participants, the Recipient and the PM. This session will be used as a forum to discuss key scheduling and resource issues including costs incurred, cost budgeted, and costs to complete each agreement task.

The Recipient must provide an agenda of each review, along with copies of materials to be presented, to the PM at least five (5) days prior to each review. Scheduling of the Bi-Annual Reviews will be mutually agreed upon between the Government's PM and the Recipient's PI.

(3) **Final Progress Report.** The Recipient must provide a final progress report within 30 days following the Agreement expiration date. Copies are to be provided, in electronic format, to the PM. The final report must include the details of accomplishing the tasks and described as prescribed in the Agreement statement of work.

(4) **Research Project Descriptions.** Within one month after project selection, the PI shall submit to the Transportation Research Board's Research in Progress (RiP) database a project description. The project information can be entered into the RiP database directly; Recipients are required to provide complete submissions to RiP including the fields for start and completion dates, total planned costs and sponsoring agency. To obtain login credentials, please contact Lisa Loyo, ([lloyo@nas.edu](mailto:lloyo@nas.edu)), TRB's Manager of Information Services. Once logged in, please view the webinar on how to enter the records. The PI is responsible for updating and maintaining project information in RiP.

(5) **Inventions, patent applications, and/or licenses.** Identify inventions, patent applications with date, and/or licenses that have resulted from the research. Submission of this information as part of an interim quarterly progress report is not a substitute for any other invention reporting

required under the terms and conditions of an award;

To comply with the Bayh-Dole Act of 1980, all CRS&SI grantees must report inventions and patents developed with CRS&SI funding (in whole or in part) to USDOT through the web-based Interagency Edison (iEdison) electronic system

(<https://public.era.nih.gov/iedison/public/checklist.jsp>). Most universities are already registered with iEdison through their office of technology transfer or office of technology licensing.

For the purposes of reporting CRS&SI-related intellectual property in iEdison on a timely basis, you must first verify that your institution is registered.

- If your institution is NOT registered, go to <https://public.era.nih.gov/iedison/public/institution/registration/RegistrationRequestForm.jsp> to request registration.

- If your institution IS registered, no further action is needed at this time.

**C. Deliverables Matrix**

All quarterly deliverables will be based on a calendar year format covering the periods: January 01 to March 31, April 01 to June 30, July 01 to September 30, October 01 to December 31. Deliverables covering partial periods of performance up to one month will be rolled over into the subsequent period of performance reports.

The Recipient must provide copies of all deliverables to the PM as shown in the Matrix shown below.

| <b><u>Report</u></b>                       | <b><u>No. Copies</u></b>          | <b><u>Submit To:</u></b> | <b><u>Due Date</u></b>   |
|--|-----------------------------------|--------------------------|--|
| Deliverables as identified in Attachment 2 | 1 Electronic                      | PM                       | Delivery Times as stated in Agreement Attachment 3, Technical and Deliverable Milestone Schedule |
| Quarterly Status Report                    | 1 Electronic                      | PM                       | 15 calendar days after the end of each quarter and as stated in Agreement Attachments 2 and 3    |
| Final Report                               | 2 Original {Color} + 1 Electronic | PM                       | 30 calendar days following Agreement expiration and as stated in Agreement Attachments 2 and 3   |
|  |                                   |                          |  |

|        |                            |    |   |
|--------|----------------------------|----|---|
| SF-425 | Original + 1<br>Electronic | PM | 30 calendar days<br>after the end of each<br>quarter and 90 days<br>after Project<br>Completion |
|--------|----------------------------|----|---|

Please copy Vasanth Ganesan ([vasanth.ganesan.ctr@dot.gov](mailto:vasanth.ganesan.ctr@dot.gov)) on all electronic submissions to the PM.

**8. NOTICE OF NEWS RELEASES, PUBLIC ANNOUNCEMENTS, AND PRESENTATIONS**

The Recipient must provide to the PM for agency review, prior to release, one (1) copy of all press releases, formal announcements, or other planned public announcements in newspapers, magazines, journals, conferences etc. containing news or information concerning this Cooperative Agreement. The Recipient must submit for PM’s advance review: (a) any such planned public presentations/briefings related to this Cooperative Agreement; and (b) the actual presentation (e.g. slides/vu-graphs) to be used. Also, a disclaimer shall be included in all the materials. The following is an example disclaimer statement for your use:

“DISCLAIMER: The views, opinions, findings and conclusions reflected in this presentation are the responsibility of the authors only and do not represent the official policy or position of the USDOT/OST-R, or any State or other entity.”

The PM will coordinate with the OST-R Office of Governmental, International and Public Affairs, which has final approval authority over all press releases, public announcements and other informational and marketing materials.

**9. CONTRACTING WITH SMALL AND MINORITY FIRMS, WOMEN BUSINESS ENTERPRISES, VETERAN-OWNED, AND HUB-ZONE AREA FIRMS**

A. It is Department of Transportation (DOT) policy to award a fair share of contracts to small, minority business, women-owned, veteran-owned and HUBZone firms. USDOT is strongly committed to the objectives of this policy and encourages all recipients of its grants and cooperative agreements to take affirmative steps to ensure such fairness on the awarding of any subcontracts under this agreement.

B. The Recipient and any sub-recipient must take all necessary affirmative steps to assure that small, women-owned, minority disadvantaged businesses, veteran, and HUBZone business firms are used when possible.

C. Affirmative steps include:

(1) Placing qualified small and minority disadvantaged businesses, women-owned business enterprises, veteran-owned and HUBZone business firms on solicitation lists;

(2) Assuring that small and minority businesses, women business enterprises, veteran-owned and HUBZone business firms are solicited whenever they are potential sources;

(3) Dividing total requirements, when economically feasible, into small tasks or quantities to permit maximum participation by small and minority business, women business enterprises, veteran-owned, and HUBZone business firms;

(4) Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority business, women business enterprises, veteran-owned, and HUBZone business firms; and

(5) Using the services and assistance of the Small Business Administration and the Office of Small and Disadvantaged Business Utilization of the Department of Transportation as appropriate.

## **10. SEAT BELT USE POLICIES AND PROGRAMS**

In accordance with Executive Order 13043, the Recipient of this award is encouraged to adopt on-the-job seat belt use policies and programs for its employees when operating company-owned, rented, or personally-owned vehicles. The National Highway Traffic Safety Administration (NHTSA) is responsible for providing leadership and guidance in support of this Presidential initiative.

For information on how to implement such a program or for statistics on the potential benefits and cost-savings to your company or organization, please visit the *Buckle Up America* section on NHTSA's website at [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov). Additional resources are available from the Network of Employers for Traffic Safety (NETS), a public-private partnership headquartered in Washington, D.C. dedicated to improving the traffic safety practices of employers and employees. NETS is prepared to help with technical assistance, a simple, user-friendly program kit, and an award for achieving the President's goal of 85 percent seat belt use. NETS can be contacted at 1 (888) 221-0045 or visit its website at [www.trafficsafety.org](http://www.trafficsafety.org).

## **11. PATENTS AND COPYRIGHTS**

**a) Patent Rights.** The Recipient shall notify USDOT promptly if any patentable invention(s), improvement(s), or discovery/discoveries are produced under this Agreement. The rights and responsibilities of the Recipient and the Federal government with respect to such patentable items will be determined in accordance with applicable Federal laws, regulations, policies, and any waiver thereof.

### **b) Copyrights.**

i) The author or the Recipient organization may copyright any books, publications, or other copyrightable materials developed in the course of or under this Agreement, but USDOT hereby reserves a royalty-free, nonexclusive and irrevocable license to reproduce, publish, or



otherwise use and to authorize others to use the work for government purposes.

ii) The Recipient shall not incorporate material copyrighted by others into any work product delivered under this Agreement unless it has acquired for USDOT a royalty-free, nonexclusive and irrevocable license to reproduce, publish, or otherwise use and to authorize others to use the work for government purposes.

iii) The Recipient may arrange for publication of initial reports of original research, supported in whole or in part by USDOT funds, in primary scientific journals and copyright by the journal unless the journal's copyright policy would preclude an individual from making or having made by any means available, without regard to the copyright of the journal and without royalty, a single copy of any such article for the individual's own use.

iv) The Recipient shall be responsible for any losses that result from or arise out of the negligent use of or breach of provisions by its employees or agents under this Agreement regarding the publication, translation, reproduction, delivery, use, or disposition of any data or protected privacy information furnished under this Agreement provided that this provision shall not be deemed a waiver by Recipient of any immunities to which it may be entitled under applicable Federal, State, or Tribal law.

## **12. ADHERENCE TO ORIGINAL PROJECT OBJECTIVES AND BUDGET ESTIMATES**

A. The Recipient is responsible for any commitments or expenditures it incurs in excess of the funds provided by an award. Expenditures incurred prior to the effective date of an award cannot be charged against award funds unless provided for in the award.

B. The Recipient must submit any proposed change that requires USDOT's written approval 30 days prior to the requested effective date of the proposed change. No change to the award will be approved during the last 30 days of the award period.

C. (1) The following expenditures require the PM's advance written approval:

(a) Changes in the scope, objective, or key personnel referenced in the Recipient's proposal.

(b) Transfer of funds between direct cost categories when the cumulative amount of transfers during the project period exceeds \$5,000.

(c) Acquisition of nonexpendable property having a useful life of more than 2 years and having an acquisition cost of \$5,000 or more.

(d) Change in the project period. This request must be received no later than 30 calendar days prior to the end of the project period. The Recipient must submit a revised budget indicating the planned use of all unexpended funds during the extension period.

(2) The Recipient must submit a revised financial estimate and plan for (a) through (c) above.

(3) The PM will notify the Recipient in writing within 30 calendar days after receipt of the

request for revision or adjustment whether the request has been approved.

D. Foreign Travel. Travel outside the 50 states and District of Columbia is considered foreign travel and a written request must be approved by the USDOT prior to such travel. In order to be approved, the need for the proposed foreign travel and the value to be gained by the participant(s) must be clearly demonstrated. Requests for approval shall include a written justification that states the name and relationship of the traveler to the agreement, describes how the travel will further the goals of the agreement, provides a detailed itinerary and breakdown of planned expenses, and carries the endorsement of the Principal Investigator. No requests submitted after the travel has begun will be approved. Inclusion of an amount for foreign-travel costs in an approved annual budget does not satisfy the requirement for prior approval.

### **13. VIOLATION OF AWARD TERMS**

If the Recipient has materially failed to comply with the terms of the award, then the Program Manager may suspend or terminate the Agreement, or take other remedies as may be legally available and appropriate in the circumstances.

### **14. APPLICABLE CIRCULARS/REGULATIONS**

The Recipient is subject to the following OMB circulars/regulations as amended, which are incorporated into this Agreement by reference. Copies of these Circulars can be obtained directly from the Internet at: [http://www.whitehouse.gov/omb/circulars\\_default](http://www.whitehouse.gov/omb/circulars_default).

#### **A. Nonprofit Organizations**

1) OMB Circular A-110, Uniform Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals, and Other Nonprofit Organizations;

2) Federal Acquisition Regulation (FAR) Part 31, Contract Cost Principles and Procedures shall apply in lieu of OMB Circular A-122, Cost Principles for Nonprofit Organizations; and,

3) OMB Circular A-133, Audits of States, Local Governments and Non Profit Organizations. **The University of Vermont and State Agricultural College** currently is audited by the audit firm **Grant Thornton**. Annual copies for recipients A-133 compliance audit will be posted to <http://www.uvm.edu/spa/?Page=uvmfactsheet.html> and recipient shall address any non-compliance issues.

**B. Department of Transportation** - Copies of these regulations can be accessed via USDOT's website at [www.dot.gov/ost/m60/grant/regs.htm](http://www.dot.gov/ost/m60/grant/regs.htm).

1) 49 CFR Part 17 "Intergovernmental Review of Department of Transportation Programs and Activities"

2) 49 CFR Part 19 "Uniform Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations"

- 3) 49 CFR Part 20 “New Restrictions on Lobbying”
- 4) 49 CFR Part 21 “Nondiscrimination in Federally-Assisted Programs of the Department of Transportation Effectuation of Title VI of the Civil Rights Act of 1964”
- 5) 49 CFR Part 29 “Governmentwide Debarment and Suspension (Non-Procurement)”
- 6) 49 Part 32 “Governmentwide Requirements for Drug Free Workplace (Financial Assistance)”
- 7) DOT Order 4600.17A “Financial Assistance Management Requirements (March 30, 2000)”
- 8) As a recipient of USDOT assistance, you must review the list of parties excluded from Federal procurement or non-procurement programs located on the Excluded Parties List System (EPLS) website: <http://www.epls.gov/> before entering into a sub-agreement or contract. As a recipient of USDOT assistance, you must inform OST-R when you take action to suspend or debar a contractor, person or entity.

C. Others

- 1) Treasury Circular No. 1075 “Regulations Governing Withdrawal of Cash from the Treasury for Advances under Federal Grant and Other Programs”
- 2) 31 CFR 205 “Rules and Procedural Guidelines for Efficient Federal-State Funds Transfers”
- 3) Assurances and Ratifications “Grant/Cooperative Agreement Application and Assurances Contained Therein”

**Attachments 1, 2, and 3 follow.**