

Contract Number: OASRTRS-14-H-UARK
Quarterly Report Progress Report Number: 3
Quarter Start and End Date: April 1, 2015 – June 30, 2015
PI Name: Richard A. Coffman
Program Manager Name: Caesar Singh

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3. Glossary of Terms

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| AASHTO | American Association of State Highway Transportation Officials |
| AEEG | Association of Environmental & Engineering Geologists |
| AHTD | Arkansas State Highway and Transportation Department |
| ARSET | Applied Remote Sensing Training |
| BLM | Bureau of Land Management |
| Co-PI | Co-Principal Investigator |
| DiGS | Directional Gamma-ray Spectrometer |
| GPRI-II | Gamma Portable Radar Interferometer Version II |
| GRA | Graduate Research Assistant |
| GRFP | Graduate Research Fellowship Program |
| ISU | Idaho State University |
| ITD | Idaho Transportation Department |
| NASA | National Aeronautics and Space Administration |
| NSF | National Science Foundation |
| PI | Principal Investigator |
| RECOVER | Rehabilitation Capability Convergence for Ecosystem Recovery |
| TAC | Technical Advisory Committee |
| TATS | Turrell Arkansas Testing Site |
| TDiAL | Topographic Differential Absorption Light Detection and Ranging |
| TRB | Transportation Research Board |
| TRR | Transportation Research Record |
| TRC | Transportation Research Committee |
| UGRA | Under Graduate Research Assistant |
| USDA | United States Department of Agriculture |
| USDOT | United States Department of Transportation |
| USGS | United States Geological Survey |
| UofA | University of Arkansas |

4. Executive Summary

The Technical Status and Business Status of the OASRTRS-14-H-UARK Contract are presented herein. Specifically, the work completed during the second quarter of the federal fiscal year (April 1, 2015 through June 30, 2015) are presented and discussed. Three deliverables were scheduled for completion during this quarter. The first deliverable, 1) development and maintenance of a project website, was completed. The second and third deliverables, 2) development of implementation plan, establishment of service providers and 3) physical demonstration of the ground-based remote sensing device were not completed due to delays encountered with purchasing of an integral piece of equipment (laser). However, progress was made on the activities associated with the deliverables that were not completed. Specifically, the operation, data collection, and data reduction of data collected from the GPRI-II and DiGS components of the device was validated during the last week of May at the TATS. Other completed activities included: 1) acquisition of required parts for the “ground based remote sensing device”, 2) preparation of the “users manual for the ground-based remote sensing device”, and 3) completion of the sub-award agreement with ISU.

A total of \$186,464.54 of USDOT funds were expended during the quarter. A total of \$103,808.48 dollars of cost-share (UofA) were expended during this quarter.

All of the pieces of equipment associated with the ground-based remote sensing device (Activity 3) were received and are currently being assembled. Based on the preliminary analyses of several pieces of equipment (ThorLabs and Newport Equipment), several additional mounts and parts are required prior to proper use. These additional parts will be acquired using currently available “supplies” funds.

5. SECTION I — TECHNICAL STATUS

Accomplishments by Milestones

Activity 1: Formation of TAC

Although the TAC was developed (as reported to Caesar Singh and Vasanth Ganesan on November 24, 2014) and the TAC committee met on December 12, 2014 in Denver, CO, no additional meetings of the TAC have been held. A virtual meeting of the TAC is scheduled for Quarter 4 (August 3, 2015) and an in-person meeting is scheduled for September 2015. The September meeting will coincide with a trip of UofA personnel to Boise, ID, to monitor a prescribed burn that has been arranged by Dr. Kathleen Lohse from ISU.

Activity 2: Development of Website, Implementation Plan, and Service Provider

A website was developed for the project (<https://wildfire-landslide-risk-dss.uark.edu>). In accordance with Deliverable 2 (and as reported to Caesar Singh and Vasanth Ganesan on November 24, 2014), the website was posted online within the first three months of the project. The official launch of the website was at the TAC Meeting on December 12, 2014. Additional content, including a video of the GPRI-II, and any updates/data from the project have been added as the content becomes available. The development of the implementation plan and service provider are underway. Although the “Implementation Plan, Fee Structure, and Utilization Rate” report was due within the first 9 months of the project start date, the delay in obtaining the equipment has prevented the completion of the report. All of the required equipment must be obtained prior to the “Implementation Plan, Fee Structure, and Utilization Rate” report because the depreciation schedule and utilization rate will be based on the actual cost of the equipment. It is estimated that the report will be completed within the next three months.

To successfully commercialize the technology that is being developed in association with this project, the PI, Co-PI, and UofA GRA attended the Commercial Remote Sensing Workshop 1 in Oklahoma City, OK, on April 29, 2015. The PI also attended the 4th Annual Arkansas Commercialization Retreat, hosted by the UofA, at the Winthrop Rockefeller Conference Center in Petit Jean, AR, from May 31 through June 2, 2015. Details about the retreat are enclosed, in the form of the agenda for the retreat. Based on the retreat, the PI has decided that the UofA GRA, who is working on the project, will enroll in a commercialization class that is being offered at the UofA this fall or next spring.

Activity 3: Development of a Ground-based Remote Sensing Device

All of the large pieces of equipment that are required for the ground-based remote sensing device have been received, with the last and most important piece of equipment (the 823nm Newport laser) arriving on June 29, 2015. The pieces of equipment are currently being assembled and tested. During assembly it was determined that several of the pieces of equipment will need electronic adapters and mounts. Therefore, these adapters are currently being purchased and the mounts are currently being fabricated.

Several of the independent pieces of required equipment have already been utilized to collect data on soil samples in the laboratory. Moreover, the GPRI-II and DiGS modules of the ground-based device were deployed to the TATS from May 25-30, 2015, and the operation of these modules was verified. The data that were collected during the visit to the TATS will be shared with the Technical Advisory Committee during the virtual conference call on August 3, 2015. The “Users Manual for Ground-based Remote Sensing Devices” report is due within the first twelve months of the project. Likewise, the “Development of a Ground-based Sensing System for Collecting Data to Determine the Amount of Risk to Transportation Infrastructure Following Wildfires” report is due within the first 12 months of the project start date.

Activity 4: Collection of Data/Creation of Databases

The conference call that was planned to occur during Quarter 2 did not occur because an additional opportunity (monitoring a prescribed burn in Idaho and monitoring prescribed burns in Arkansas) became available. The conference call was postponed to enable details of the use of prescribed burn data to be determined. However, the details have not yet been finalized. Therefore, the conference call, with the TAC, will aid in determination of the sites that will be tested during this project. It is still anticipated that the Waldo Canyon area will be one of the sites in addition to the Idaho prescribed burn area and the Arkansas prescribed burn area.

All of the papers containing data that have been used to develop the USGS probabilistic model have been acquired and placed into a spreadsheet. These data will serve as the preliminary data for the database of remotely sensed properties. Moreover, the statistics of the USGS data have also been recalculated using newer statistics techniques than were available to the USGS at the time of publishing the database. A better statistical technique has been established and will be implemented into the decision support system that is associated with this project, based on the results from the new statistical techniques. The actual “Database of Remotely Sensed Properties” will be demonstrated and reported within 18 and 21 months, from the project start date, respectively.

Activity 5: Development of a Probabilistic Model Decision Support System

Based on the discussions of the TAC, during the TAC meeting, the creation of a landslide probabilistic model for the RECOVER decision support system is much needed. The model is anticipated to mimic the model created by the USGS but will be based on remotely sensed data instead of or in addition to pointwise data. As previously mentioned, a conference call with the members of the Technical Advisory Committee is planned to occur during Quarter 4. The creation of a new model, based on statistical analysis of the USGS data, will be presented and discussed during the virtual meeting. Moreover, the ingestion of the statistical model (R-based computer code) into the GIS-based RECOVER system will also be discussed during the meeting. Furthermore, the conference call will aid in finalizing the structure of the probabilistic model within the RECOVER system. “The Development of a Remote Sensing Based Decision Support System to Determine the Amount of Risk to

Transportation Infrastructure Following Wildfires” demonstration and report are due within 19 to 24 months from the project start date, respectively.

Activity 6: Reporting and Publication

This quarterly report is the third in a series of quarterly reports. A synopsis of the results from the obtained data is reported herein. Based on the obtained data, several abstracts have also been prepared for the 2015 meeting of the AEEG that will be held in Pittsburg, PA, on September 24. Specifically, the authors and titles of the abstracts that have been accepted have been accepted for presentation are included below. The acceptance e-mail from the conference is enclosed.

Kern, A., Coffman, R., Oommen, T., Addison, P. (2015) “Predictive Modeling of Debris Flows Probability Following Wild Fire in the Intermountain Western United States.” Association of Environmental & Engineering Geologists Annual Meeting.

Salazar, S., Garner, C., Coffman, R., Oommen, T. (2015) “Ultra-violet Near-infrared Reflectance Spectroscopy for Remote Measurement of Soil Potential.” Association of Environmental & Engineering Geologists Annual Meeting.

A paper has also been prepared for the 95th Annual Meeting of the Transportation Research Board. The authors and titles of the paper that will be submitted on August 1, 2015, are included below.

Garner, C., Coffman, R., (2015). “Evaluation of a field and laboratory remote sensing method for determining soil Atterberg limits and clay content.” Transportation Research Record. (in preparation).

In addition to the aforementioned conference proceedings, as data become available, the results will be rapidly disseminated utilizing the website. “The Remote Sensing Assessment System for Evaluating Risk to Transportation Infrastructure Following Wildfires” report is due within 24 months from the project start date, respectively.

Problems Encountered

Although the volatility of the Swiss Franc was mentioned as a problem encountered in the first quarterly report, the volatility of the Swiss Franc dissolved and the Gamma Remote Sensing device was able to be acquired for a price that was under budget. The newest problem that was encountered is related to the development of the TDiAL module. Specifically, one of the lasers (the 823nm laser) did not pass the final spec test and was reworked (see enclosed e-mail). This delay in manufacturing of the equipment has delayed the development of the TDiAL module thereby preventing completion of the physical demonstration of the ground-based remote sensing device.

Future Plans

Several milestones are required to be accomplished during the next quarter. These milestones include milestones that were not completed during the quarter that is being reported in this quarterly report (Quarter 3) and previously planned Quarter 4 milestones that will be completed, on schedule, during the next quarter. The specific milestones that will be completed are listed below; interesting findings associated with these milestones will also be reported.

"Implementation Plan, Fee Structure, and Utilization Rate" report.

"Development and Maintenance of Website" report.

"Ground Based Remote Sensing Device" demonstration of the device.

"Users Manual for Ground-based Remote Sensing Device" report.

Several demonstrations of the device will take place during the upcoming quarters (Quarters 4 and 5). These demonstrations include: 1) a demonstration to the TAC at the Waldo Canyon Wildfire site near Manitou Springs, CO, on September 15, 2015, 2) a prefire demonstration to additional stakeholders (IDT, USGS, USDA, BLM, NSF, NASA) at Johnston Draw within the Reynolds Creek Experimental Watershed, Owyhee County, south of Boise, ID, on September 17, 2015, 3) a demonstration to Caesar Singh when he visits the UofA campus on September 23-24, 2015, 4) a demonstration to additional stakeholders (NASA) at the NASA ARSET workshop from October 6-8, 2015, in Pocatello, ID; this demonstration will follow postfire data collection at the Reynolds Creek Experimental Watershed, 5) a demonstration to the Commercial Remote Sensing Workshop 2 in Oklahoma City, OK, on December 2-3, 2015.

6. SECTION II — BUSINESS STATUS

As shown in Table 1, the amount of time that was allocated for the project and the amount of time that was expended on the project are documented. Time has been expended and charged for the academic year and summer costs associated with the PI and Co-PI. The number of expended hours that are reported in Table 1 were associated with time spent in: weekly meetings (PI, GRA, UGRA); in bi-weekly meetings (PI, the GRA, the Co-PI, Co-PI's GRA, Co-PI's UGRA); developing and maintaining the website; ordering equipment; preparing assembly of the various pieces of equipment; collecting data with the new equipment; collecting data related to the probabilistic model; and preparing the quarterly report.

The GRAs expended additional hours on the ground-based device. These additional hours were associated with having additional personnel working on the project. Sean Salazar was selected for a NSF GRFP and, as of June 1, 2015, has moved from being funded on this USDOT project to being funded by the NSF GRFP. Therefore, the time spent by Sean on this USDOT project during the month of June, as associated with his NSF GRFP, is being shown as match. Cyrus Garner has replaced Sean Salazar on the USDOT project, effective June 1, 2015. Two UGRAs (Leah Miramontes and Brendan Yarborough) spent time working on the project during the third quarter. However, the students did not complete work after the academic year (after May 15) because they both accepted internships for the summer. The amount of time spent is also lacking in hours (by 17.5 hours) because the hours expended by the students during the May 1 through May 15 pay cycle were not approved until after the reporting of the quarter; these hours will, therefore, not be billed until the next quarter (Quarter 4).

Table 1. Hours allocated and expended.

| Quarter 3, Year 1 | USDOT Allocated (Hours) | UofA Allocated (Hours) | USDOT Expended (Hours) | UofA Expended (Hours) |
|----------------------------|-------------------------|------------------------|------------------------|-----------------------|
| PI – Quarterly Report | 8 | 8 | 8 | 8 |
| PI - Website | | 10 | | 10 |
| PI – Ground Based Device | 24 | 46 | 24 | 46 |
| PI – Data Collection | 10 | | 10 | |
| GRA – Quarterly Report | 20 | | 20 | |
| GRA - Website | 10 | | 10 | |
| GRA – Ground Based Device | 200 | | 200 | 120 |
| GRA – Data Collection | 30 | | 30 | 48 |
| GRA - Publications | 40 | | 40 | |
| UGRA - Website | 20 | | 0 | |
| UGRA – Ground Based Device | 80 | | 39.25 (56.75) | |
| UGRA – Data Collection | 20 | | 0 | |
| Admin - Website | 21.7 | | 21.7 | |

Based on the number of hours expended, the level of effort that was expended by personnel from the UofA was 100.0 percent for the PI, 268.4 percent for the GRA, 32.7 percent (really 47.2 percent but some of the hours were not approved in time for reporting for this quarter) for the UGRA, and 100 percent for the Admin.

As shown in Table 2, the amount of Year 1 funds that were allocated for the project and the amount of funds that were expended on the project are documented. All of the receipts associated with the funds that were expended for equipment during Quarter 3 are enclosed within this quarterly report. Portions of the dollar amounts that are highlighted in red have resulted from errors in accounting. Two items that were supposed to be charged as equipment (receipts from Krohn-Hite and Beaver Lake Distribution) were charged to supplies. These items have since been moved into the equipment category (the receipts for these two items are enclosed for completeness). A travel charge of \$107.04 should have been reimbursed back to the project. This charge has since been refunded to the project but was not refunded at the time of the quarterly report. The correction to the erroneous charges will be shown on the next quarterly report statement.

Table 2. Funds allocated and expended for Year 1.

| Year 1 | USDOT Allocated (\$) | UofA Allocated (\$) | USDOT Expended (\$) | UofA Expended (\$) |
|----------------------|----------------------|---------------------|---------------------|--------------------|
| Salaries | 67,410.00 | 15,126.00 | 25,917.64 | 15,163.78 |
| Fringes | 2,470.00 | 3,872.00 | 2,330.24 | 3,881.97 |
| Supplies | 6,750.00 | 3,825.00 | 7,776.65 | 0.00 |
| Travel | 3,250.00 | 15,000.00 | 187.63 | 3,794.84 |
| Other | 0.00 | 75,000.00 | 0.00 | 75,493.20 |
| Indirect | 21,400.00 | 0.00 | 9,694.38 | 0.00 |
| Tuition | 0.00 | 8,148.00 | 0.00 | 5,284.70 |
| Subcontract | 54,788.00 | 0.00 | 0.00 | 0.00 |
| Subcontract Indirect | 25,000.00 | 0.00 | 0.00 | 0.00 |
| Equipment | 278,635.00 | 114,051.00 | 230,229.13 | 78,936.78 |

7. ADVISORY/STEERING COMMITTEE MEETING

No TAC meetings were held during this quarter.

8. CONFERENCE PRESENTATIONS/PUBLICATIONS DETAILS BY PROJECT TEAM MEMBER IN UPCOMING QUARTER

As previously mentioned, the personnel associated with this project will prepare abstracts/papers/presentations for several conferences. Specifically, papers and presentations will be prepared for the annual meetings of the AEEG and the TRB.

For the paper that has been prepared for the 95th Annual Meeting of the TRB, if the paper is selected to be published in the Transportation Research Record then the paper will be published in this journal. However, if the paper is not selected to be published in the TRR then the paper will be pulled from consideration and submitted to another journal. Either way, a presentation on the research will be presented at the 95th Annual Meeting of the TRB.

Personnel from the UofA have been contacted by personnel from AHTD to speak at the AASHTO Subcommittee on Construction meeting that will be held in Little Rock, AR, on August 10, 2015. The title of the presentation is included below. Personnel from the UofA have also contacted the research office at the AHTD and anticipate presenting the preliminary results of this project at the Spring 2016 AHTD TRC conference.

AASHTO Subcommittee on Construction. "Water: The Enemy of Construction,"
Little Rock, AR, August 10, 2015

The personnel associated with this project have also been asked to participate in a NASA ARSET "Remote Sensing for Wildfire Applications" workshop that will be held at ISU in Pocatello, ID, from October 6 through 8, 2015. This participation includes attending the workshop, presenting a poster, and also providing support about the post-wildfire landslide module that is being developed as a part of this USDOT funded project for the RECOVER system.

9. APPENDIX FOR QUARTER

A copy of the executed subcontract between the UofA and the ISU is included herein. Although ISU will not be involved in the project until Year 2, the subcontract documentation was executed at this time to ensure a smooth transition between Year 1 and Year 2.

A copy of the receipts for equipment that was ordered/purchased during the quarter are also included herein. These receipts are included for equipment from the following manufacturers: Astronomics, Gamma Remote Sensing, Thor Labs, Krohn-Hite, Newport, Beaver Lake Distribution.

- In association with travel to the Commercial Remote Sensing Workshop 1, held in Oklahoma City, OK, the Meade telescope was picked up from Astronomics in Oklahoma City, OK, on April 28, 2015.
- The UofA Gamma Remote Sensing Portable Radar Interferometer Version II device was sent back to Switzerland on November 13, 2014, for upgrades. The device was received back at the UofA on March 8, 2015. The receipts for the initial down payment and the final payment are enclosed. As previously mentioned the operation of the device was validated during testing at the TATS during the last week of May 2015.
- All of the pieces of equipment that were ordered from ThorLabs were delivered on or before June 12, 2015.
- The 823nm laser, 852nm laser, fiber optic couplers, and balanced photo receiver were received on June 10, 2015, or June 22, 2015.
- The dual-band pass filter from Krohn-Hite was received on June 15, 2015.
- The trailer that will be used to transport the device was purchased from Beaver Lake Distribution on June 29, 2015.

The agenda for the 4th Annual Arkansas Commercialization Retreat, hosted by the UofA, at the Winthrop Rockefeller Conference Center in Petit Jean, AR, from May 31 through June 2, 2015 is enclosed. The certification letter outlining the contribution of matching funds for use of the UofA GPRI-II is included for completeness. The acceptance letter for the abstract for AEEG is also included for completeness.

**UNIVERSITY OF ARKANSAS
SUBAWARD AGREEMENT**

This Subaward Agreement is entered into by and between the Board of Trustees of the University of Arkansas acting for and on behalf of the University of Arkansas, 210 Administration Building, 1 University of Arkansas, Fayetteville, AR 72701 (hereinafter referred to as "UNIVERSITY"), an educational institution of the State of Arkansas, and Idaho State University, Office of Research, 921 South 8th Avenue, Stop 8130, Pocatello, Idaho 83209-8130 (hereinafter referred to as "SUBRECIPIENT").

WHEREAS, the UNIVERSITY has entered into Award No. OASRTRS-14-H-UARK, (hereinafter referred to as the PRIME AGREEMENT) and included herein as Appendix A, funded by the U.S. Department of Transportation, (hereinafter referred to as the SPONSOR), under CFDA #20.931 for the project entitled "Remote Sensing Based Assessment for Evaluating Risk to Transportation Infrastructure Following Wildfires", (hereinafter referred to as the PROJECT); and

WHEREAS, UNIVERSITY desires the assistance of the SUBRECIPIENT to perform work within the scope of the PRIME AGREEMENT; and

WHEREAS, SUBRECIPIENT has skilled personnel and facilities to undertake portions of this PROJECT and agrees to participate in the PROJECT as set forth in this Subaward Agreement for the consideration stated herein.

NOW THEREFORE, in consideration of the mutual covenants and agreement hereinafter set forth, the parties agree as follows:

ARTICLE I - GENERAL PROVISIONS

This Subaward Agreement is issued under the authority of the PRIME AGREEMENT mentioned above and all applicable requirements, regulations and provisions of the PRIME AGREEMENT shall be binding upon SUBRECIPIENT and are hereby incorporated and made a part of this Subaward Agreement. SUBRECIPIENT agrees to abide by the provisions of OMB Circulars A-21 and A-110, as well as other required federal and state regulations applicable to this project. All requirements imposed upon the UNIVERSITY by the SPONSOR shall be imposed upon the SUBRECIPIENT unless otherwise provided for in this Subaward Agreement or under the terms of the PRIME AGREEMENT.

ARTICLE II - STATEMENT OF WORK

The SUBRECIPIENT shall supply all necessary facilities, labor, materials and any other items required to accomplish the work to be performed under this Subaward Agreement as described in the Statement of Work attached to this Subaward Agreement as Appendix B.

ARTICLE III - KEY PERSONNEL

SUBRECIPIENT'S performance of the work, as described in Appendix B, shall be under the direction of Dr. Keith Weber. No diversion, substitution, or replacement of this individual or substantial reduction in the level of effort of this individual shall be made without the prior written approval of UNIVERSITY.

UNIVERSITY'S performance of the work pursuant to the PRIME AGREEMENT will be under the direction of Dr. Richard A. Coffman.

ARTICLE IV - PERIOD OF PERFORMANCE

The period of performance for this Subaward Agreement shall begin on 9/15/2015 and shall terminate on 9/14/2016. Renewal of the Subaward Agreement is subject to the continuation of the PRIME AGREEMENT and upon mutual agreement of both parties, which shall be provided for in writing and signed by authorized representatives of both parties. No expenses will be reimbursed which are incurred prior to the beginning date, or subsequent to the termination date of this Subaward Agreement.

ARTICLE V - CONSIDERATION AND PAYMENT

The UNIVERSITY will reimburse SUBRECIPIENT for its actual expenditures for those costs specifically provided for in the attached budget, Appendix C, not to exceed a total of Twenty Thousand and Fifty Two Dollars (\$20,052). SUBRECIPIENT will document all cost-sharing activities on this project in an amount of Twenty Thousand and Fifty Two Dollars (\$20,052).

SUBRECIPIENT shall submit no more frequently than once a month, detailed requests for payment, by major budget category, for costs incurred by SUBRECIPIENT in performance of this Subaward Agreement. The request shall use the format(s) shown in Appendix D. The final request for payment shall be submitted within 45 days after the termination date of this Subaward Agreement. The request shall reference Subaward Agreement No. SA1501076 and shall contain the following certification statement signed by an appropriate official:

"I certify that all payments requested are for appropriate purposes and in accordance with the agreements set forth in the application and award documents. The documentation required by current Federal regulations for these costs is on file and will remain available for audit by University of Arkansas and the appropriate Federal auditors for the period required by Federal regulations."

Request for payment which includes costs for consultant services must contain: 1) an adequate description of the services provided, 2) the basis for how the consultant charges were determined, and 3) a certified statement by the consultant that the services were provided for the project. Requests shall be submitted to the following address:

University of Arkansas
Office of Sponsored Projects Accounting
Attn: Steve Turner
305 Administration Building
1 University of Arkansas
Fayetteville, AR 72701

Payment will be made by UNIVERSITY to SUBRECIPIENT promptly after receipt of detailed and certified billings and the receipt of these funds from SPONSOR.

ARTICLE VI - REBUDGETING OF FUNDS

The SUBRECIPIENT is authorized to rebudget funds which do not require prior approval in accordance with SPONSOR'S requirements (Article I). Such rebudgeting of funds must be approved by the authorized official of the SUBRECIPIENT who is designated to grant such approval. A copy of all such rebudgeting approvals referencing the appropriate Subaward Agreement Number shall be submitted to UNIVERSITY at the following address:

University of Arkansas
Research & Sponsored Programs
Attn: Subaward Administrator
210 Administration Building
1 University of Arkansas
Fayetteville, AR 72701
e-mail: scheibel@uark.edu

ARTICLE VII - TITLE TO EQUIPMENT

Title to equipment purchased under this Subaward Agreement will reside with the SUBRECIPIENT, subject to the recall provisions, if any, of the SPONSOR and after receipt of final disposition by UNIVERSITY from SPONSOR. Inventory and accountability of equipment will be in accordance with policies of the SPONSOR, as given in Article I above and OMB Circular A-110.

ARTICLE VIII - FINANCIAL RECORDS AND AUDITS

SUBRECIPIENT shall maintain financial records, supporting documents and other records pertaining to all costs and expenditures incurred under this Subaward Agreement for the period of time required by PRIME AGREEMENT. If any litigation claim or audit is started before the expiration of this retention period, the records shall be retained until all litigation, claims or audit findings have been resolved. Records for non-expendable property acquired with funds received under this Subaward Agreement shall be retained for the period of time required by the PRIME AGREEMENT.

SUBRECIPIENT agrees to comply with the requirements of OMB Circular A-133 and shall supply to UNIVERSITY a copy of SUBRECIPIENT'S most recent A-133 audit. SUBRECIPIENT further agrees to provide UNIVERSITY with copies of any of the independent auditor's reports which present instances of non-compliance with federal laws and regulations which bear directly on the performance or administration of this Subaward Agreement. In cases of such non-compliance, SUBRECIPIENT will provide copies of responses to auditor's reports and a plan for corrective action.

SUBRECIPIENT agrees that UNIVERSITY and governmental auditors shall have access for audit purposes to any books, documents, papers and records which are pertinent to the project at any reasonable time during the contract and retention periods.

SUBRECIPIENT further agrees that any audit exceptions for this Subaward Agreement, which are noted by governmental or UNIVERSITY auditors shall be the sole responsibility of the SUBRECIPIENT. The SUBRECIPIENT shall reimburse the UNIVERSITY for the total of all disallowed costs for which the SUBRECIPIENT has received payment from the UNIVERSITY.

SUBRECIPIENT shall submit to UNIVERSITY a copy of its currently approved Federal Facilities and Administrative Cost Rate Agreement, if applicable, and copies of any subsequent F&A Rate Agreements approved during the course of the Subaward Agreement.

ARTICLE IX - PROGRESS REPORTS AND RECORDS

SUBRECIPIENT will render periodic progress reports as directed by UNIVERSITY and will make a final report within forty-five (45) days of the termination of this Subaward Agreement. During the term of this Subaward Agreement, representatives of SUBRECIPIENT will consult and/or meet with representatives of UNIVERSITY to discuss progress and results, as well as on going plans of the project.

SUBRECIPIENT shall maintain original project records as directed by the UNIVERSITY and as required by the SPONSOR, which must be available for inspection by authorized representatives of the UNIVERSITY and/or the SPONSOR.

ARTICLE X - NATURE OF RELATIONSHIP

SUBRECIPIENT is an independent contractor and shall not act as an agent for UNIVERSITY, nor shall it be deemed to be an employee of UNIVERSITY for any purpose whatsoever. SUBRECIPIENT shall not enter into any agreement nor incur any obligations on behalf of UNIVERSITY, nor commit UNIVERSITY in any manner without prior written consent.

ARTICLE XI - PUBLICITY

SUBRECIPIENT shall not use the name of UNIVERSITY nor the name of any member of the project staff on any unpublished information, or in any publicity or advertisement, whether with respect to this Subaward Agreement or any other related matter, without the prior written approval of an authorized representative of the UNIVERSITY. UNIVERSITY will not use the name of SUBRECIPIENT nor any employee of SUBRECIPIENT, in any publicity without the prior written approval of an authorized representative of SUBRECIPIENT.

ARTICLE XII - PUBLICATIONS

Results of the project conducted under this Subaward Agreement may be published jointly by the UNIVERSITY and SUBRECIPIENT or by either party separately, always giving due credit to the other party. However, prior to any such publication, SUBRECIPIENT will submit a copy of any proposed publications to UNIVERSITY, thirty (30) days prior to such publication. Copyrights to copyrightable materials first created solely by SUBRECIPIENT'S personnel in the performance of the Project shall vest in SUBRECIPIENT. SUBRECIPIENT hereby grants to UNIVERSITY, an irrevocable, royalty-free, non-exclusive license to reproduce, distribute, translate and use all such copyrighted material for research and educational purposes.

ARTICLE XIII – PATENTS AND INVENTIONS

If patentable discoveries result from the work sponsored under this Subaward Agreement, patent rights will be vested in accordance with the Government wide regulations, 37 CFR Part 401 and the terms and conditions of the PRIME AGREEMENT.

For all purposes herein, "Invention" shall mean any discovery, concept or idea whether or not patentable or copyrightable, which (i) arises out of work performed pursuant to the obligations of this Subaward Agreement; (ii) is conceived and reduced to practice during the term of the Subaward Agreement as defined in ARTICLE IV hereinabove; and (iii) includes but is not limited to processes, methods, software, formulae, techniques, compositions of matter, devices, and improvements thereof and know-how relating thereto. Inventions made solely by employees or agents of SUBRECIPIENT shall be the sole property of SUBRECIPIENT. Inventions made jointly by employees or agents of SUBRECIPIENT and UNIVERSITY shall be jointly owned by SUBRECIPIENT and UNIVERSITY.

The SUBRECIPIENT will ensure that all of its employees who perform any part of the work under this Subaward Agreement and who may be reasonably expected to make inventions agree in advance to assign their rights in such inventions to the SUBRECIPIENT. The SUBRECIPIENT shall promptly disclose any potentially patentable inventions to the UNIVERSITY'S representative who signed below. The

SUBRECIPIENT shall submit a final report of inventions no later than thirty (30) days after the expiration of the Subaward Agreement to the following address:

University of Arkansas
Research Support & Sponsored Programs
Attn: Subaward Administrator
210 Administration Building
1 University of Arkansas
Fayetteville, AR 72701

ARTICLE XIV SUBCONTRACTING

SUBRECIPIENT will not subcontract or subgrant any portion of PROJECT without the expressed written authorization of UNIVERSITY or as provided herein.

ARTICLE XV – RESPONSIBILITY

The parties each agree to assume individual responsibility for the actions and omissions of their respective employees, agents and assigns in conjunction with this Project.

ARTICLE XVI - CERTIFICATIONS AND ASSURANCES

Human Subjects

If use of human subjects is required in the performance of the research work, the SUBRECIPIENT warrants and agrees to comply with the applicable federal laws, regulations and policy statements then in effect. The SUBRECIPIENT further agrees to provide Certifications to UNIVERSITY, upon execution of this Subaward Agreement, that an Institutional committee responsible for such matters has reviewed and approved the procedures involving human subjects.

Live Vertebrates

The use of live non-human vertebrate animals in the conduct of the research will comply with applicable portions of the Animal Welfare Act (P.L. 89-544, 1966 as amended) and will follow the policies and procedures of the Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals, (OPRR 1996) and Guide for the Care and Use of Laboratory Animals, (NRC 1996).

In accordance with the above cited policies, verification of review and approval by a PHS approved Animal Care & Use Committee of the proposed animal protocol shall be submitted by SUBRECIPIENT to UNIVERSITY upon execution of this Subaward Agreement.

Biohazards and Occupational Safety

SUBRECIPIENT shall act responsibly in matters of Occupational Safety and shall take all necessary and appropriate safety measures in performing under this Subaward Agreement. SUBRECIPIENT shall comply with all applicable Federal, State, and local laws relating to Occupational Safety.

If the work to be performed by SUBRECIPIENT requires the use of biohazards, SUBRECIPIENT warrants and agrees to comply with the applicable federal laws, regulations and policy statements then in effect. The SUBRECIPIENT further agrees to provide Certifications to UNIVERSITY, upon execution of this

Subaward Agreement, that an Institutional committee responsible for such matters has reviewed and approved the procedures involving biohazards.

Hazardous Material

SUBRECIPIENT warrants and agrees to require and maintain records regarding the training of employees in the handling, use, transport or disposal of hazardous materials. Where work on the PROJECT involves hazardous material, SUBRECIPIENT shall comply with all Federal, State and local laws and regulations concerning the transportation, handling, and disposal of such materials. Compliance with the provisions of this clause by lower tier subrecipients will be the responsibility of SUBRECIPIENT.

Debarment and Suspension

In accepting this Subaward Agreement, the SUBRECIPIENT certifies that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation in this transaction by any Federal department or agency. Any change in the debarred or suspended status of the SUBRECIPIENT during the life of this Subaward Agreement must be reported immediately to the UNIVERSITY. This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 34 CFR Part 85, Section 85.510, Participant's Responsibilities. The regulations as Part VII of the May 26, 1988 Federal Register.

Certification Regarding Lobbying (if subaward > \$100,000)

By signing this Subaward Agreement, SUBRECIPIENT certifies, to the best of their knowledge and belief, that:

- (1) No Federal appropriated funds have been paid or will be paid by or on behalf of SUBRECIPIENT, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an Officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, SUBRECIPIENT shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (3) SUBRECIPIENT shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and other contracts under grants, loans, and cooperative agreements) and that all lower-tier subrecipients shall certify and disclose accordingly.

Misconduct In Science (If Prime Sponsor is the DHHS)

By signing this Subaward, SUBRECIPIENT certifies that it has established administrative policies as required by Final Rule, 42 CFR 50, Subpart A, "Responsibilities for PHS Awardee and Applicant Institutions for Dealing with and Reporting Possible Misconduct in Science," and that it will comply with those policies and the requirements of the final rule, which include the filing of appropriate assurances with the PHS Office of Research Integrity.

Civil Rights

Title VI of the Civil Rights Act of 1964 (P.L. 88-352; 42 USC 200d-1 and to the extent applicable.....) provides that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance. Title IX of the Education Amendments of 1972 (P.L. 92-318; 20 USC 1681-1686), prohibits the exclusion of persons on the basis of sex from any education program or activity receiving Federal financial assistance. By acceptance of this Subaward, the SUBRECIPIENT agrees that it will comply with all the laws stated herein.

SUBRECIPIENT agrees to notify UNIVERSITY immediately if there is any change of status regarding any of the above Certifications and Assurances.

ARTICLE XVII - TERMINATION

Either party may terminate this Subaward Agreement provided written notification is received by the other party thirty (30) days prior to the proposed termination date. It is expressly understood and agreed that in the event that the Prime Contract is terminated or the funding thereunder ceases or is reduced, UNIVERSITY may, at its option, terminate, in whole or in part, this Agreement by sending written notice of termination to the SUBRECIPIENT. Notwithstanding the above, SUBRECIPIENT shall be reimbursed for allowable costs and noncancelable obligations properly incurred prior to the date of notice of termination.

ARTICLE XVIII - MODIFICATION

This document and its Appendix(es) constitute the entire agreement between the parties relative to the subject matter. Except as set forth in ARTICLE XVII – TERMINATION, any change to the terms of this Subaward Agreement shall be valid when the change is made in writing and approved by the authorized representatives of the parties hereto.

IN WITNESS WHEREOF, this Agreement may be executed in one or more counterparts, each of which when executed and delivered shall be deemed to be an original, but all of which taken together constitutes one and the same instrument. Executed agreement documents transmitted by electronic means are considered original documents. This Agreement is effective upon the date last signed and executed by the authorized representatives of the parties.

IDAHO STATE UNIVERSITY

By: *Maurice Hays*
Title: Director of Research Contracts
Date: 4/30/15

BOARD OF TRUSTEES OF THE UNIVERSITY OF ARKANSAS

By: *Kathy Scheibel*
Title: Research & Sponsored Programs
Date: 5/4/15

826000924

IRS Identification Number

delegated sign. auth. of Dr. Vander Schyf, VP Research

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COOPERATIVE AGREEMENT
No. OASRTRS-14-H-UARK

BETWEEN

BOARD OF TRUSTEES, UNIVERSITY OF ARKANSAS
210 ADMINISTRATION BUILDING
FAYETTEVILLE, AR 72701

AND

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

FOR

**Remote Sensing Based Assessment for Evaluating Risk to Transportation Infrastructure
Following Wildfires**

Total Amount of Agreement: \$1,143,807

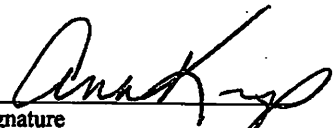
Total Estimated Federal Government Funding of the Agreement: \$571,901

Total Estimated Recipient Cost-Share: \$571,906

Appropriation Data: 8083XXDA0/2014/RDRNDRS0LU/53D0980000/41000 \$571,901

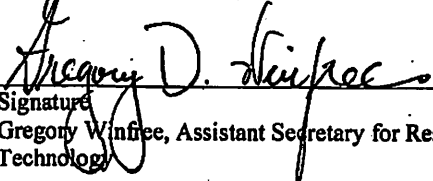
AUTHORITY: This agreement is entered into between the U.S. Department of Transportation (USDOT), represented by the Office of the Assistant Secretary for Research and Technology (OST-R), and the Board of Trustees, University of Arkansas acting for and on behalf of the University of Arkansas Fayetteville Campus, DUNS:19-142-9745, Taxpayer ID#:716003252, 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).

BOARD OF TRUSTEES
UNIVERSITY OF ARKANSAS


Signature
Ann Kemp, Vice President for
Administration

9/8/14
Date

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


Signature
Gregory Winfree, Assistant Secretary for Research and
Technology

SEP -5 2014

Date

SEPTEMBER 15, 2014
Effective Date

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ATTACHMENTS

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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 Arkansas (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 a **remote sensing based assessment system for evaluating risk to transportation infrastructure following wildfires** which promises to extend the available Commercial Remote Sensing & Spatial Information tools to **enhance mudflow and rockfall risk**. The goal of this sixth phase research is to evaluate the applicability of satellite-, unmanned aerial vehicle (UAV)-, and ground-based optical, thermal, RADAR, and LIDAR technologies to obtain specific parameters of interest to characterize the risk of mudflows and rockslides as a specific site as determined using decision based support system. The research team includes the following key persons:

1. PI: Richard Coffman, Ph.D., Assistant Professor, University of Arkansas
2. Co-PI: Thomas, Oommen, Ph.D., Assistant Professor, Michigan Technological University
3. Other Team Member: Keith T. Weber, M.S., GIS Director, Idaho State University

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 Arkansas to assist USDOT/OST-R in this endeavor.

Under the terms of this agreement, the **UNIVERSITY OF ARKANSAS** will assist OST-R with the following tasks:

Activity 1 – Development of the Technical Advisory Committee (TAC), Kickoff Meeting and TAC Meetings

Although the TAC will be selected by the Program Manager (at the commencement of the project), the membership is anticipated to be drawn from a broad spectrum of stakeholders.

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The TAC will be charged with evaluating the project approach, recommending methods and equipment, reviewing the results, and recommending outreach opportunities for dissemination of research findings. The TAC will be tasked with guiding the proposed research to ensure that the proposed course of action meets the needs of the transportation agency stakeholders and also accomplishes the objectives of the research initiative. Two in person meetings are proposed. Because most of the proposed work will occur on the West Coast, and because most of the members of the TAC are from the states in which the research will be conducted, the meetings are proposed to be held in Denver, Colorado.

Output(s):

- Creation of TAC.
- At least two in-person meetings with the TAC.
- Periodic virtual meetings with the TAC.

Deliverable(s):

- TAC meeting reports will be included in the quarterly reports.

Activity 2 – Development of Implementation Plan, Establishment of Service Providers, and Establishment of Website

Implementation Plan: A comprehensive implementation plan will be developed to provide stakeholder outreach and to establish service providers to 1) deliver utilization of the equipment (ground based radar remote sensing device) and 2) host the decision support system by the end of the project. Promotional videos about the will be developed by students in the Cin/Optics group at Michigan Technological University. These videos will be housed on the project website and will be shown to stakeholders to assist with technology transfer and technology implementation.

Establishment of Service Providers: The identified service provider to deliver utilization of the equipment will be the Mack-Blackwell Rural Transportation Center (MBTC). Through the MBTC, the PI will provide services of data acquisition, processing, and analysis for end-users, using the DSS system, specifically for interested parties at state DOTs. The availability of the equipment and the fee schedule that is developed will be housed on the project website that will be created, published, and maintained in an effort to disseminate the knowledge gained from this project. The decision support system will also be housed on the project website. Furthermore, the decision support system will be incorporated into the cloud- and web-based Rehabilitation Capability Convergence for Ecosystem Recovery (RECOVER) program that is currently sponsored by NASA Goddard Flight Center (with end-users including: the Idaho Department of Transportation, the Idaho Department of Land, the Bureau of Land Management, the United States Forest Service, the United States Geological Survey, and the Federal Emergency Management Agency).

Website: To ensure dissemination to transportation related professionals, a link to the website will also be included on the USDOT/CRS&SI website. In addition to the website serving as an outreach portal to the general public, the website will be used to identify needs (using a comments/contact us methodology), to create product awareness, and to keep the sponsor, TAC and other stakeholders up to date on the progress of the project. Specifically, the website will be used to ensure the development and validation of the “Commercial Remote Sensing and Spatial Information Technology” components of this research.

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Output(s):

- Implementation plan
- Equipment utilization rate and usage agreement (service plan), used to ensure the equipment is self-sustaining and available to all stakeholders.
- Project website, created and maintained for the entire duration of the project.

Deliverable(s):

- A summary of the operating webpage will be included in the first quarterly report.
- The requirements and guidelines for the 1) utilization of the ground-based remote sensing device and 2) the decision support system will be incorporated into the final report.

Activity 3 – Development of a Ground-Based Remote Sensing Device

The existing Gamma Portable Radar Interferometer Version II (GPRI-II) device will be retrofit to 1) make the device fully-polarimetric and to 2) include two new modules. The theory of the respective modules has been validated and utilized, however, a device of this nature has not previously been developed and fabricated. Specifically, through the development of this device, a Commercial Remote Sensing and Spatial Information Technology device will be developed and validated to provide new application for transportation infrastructure risk assessment.

Output(s):

- The Topographic Differential Absorption Light Detection and Ranging (TDiAL) module.
- The Directional Gamma-ray Spectrometer (DiGS) module.
- The GPRI_II, TDiAL, and DiGS combined device.

Deliverable(s):

- Users manual for the device.
- Physical demonstration of the device.
- Technical report entitled “The Development of a Ground-Based Remote Sensing System for Collecting Data to Determine the Amount of Risk to Transportation Infrastructure Following Wildfires”.

Activity 4 – Collection of Data, Creation of a Database of Soil Properties in Wildfire Areas

A database of the soil properties that were previously collected in wildfire areas will be created and managed. The database will contain the soil properties that were collected from satellite-based, ground-based, and UAV-based observation of the sites selected as training data. The database will increase in size following implementation of the remote sensing based decision support system (RSBDSS) because all of the data that is ingested into the RSBDSS must first be cataloged into the database. Parameters of interest that will be included into the database, on a pixel by pixel scale, include location: normalized difference vegetation index (NDVI), normalized burn ratio (NBR), differenced normalized burn ratio (dNBR), volumetric water content (θ), Saturation (S), unit weight (γ), vertical displacement (δ), matric potential (ψ), temperature (T), topography, mineral type, radionuclide concentration, and clay content.

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Output(s):

- Collection of data
- Creation of database

Deliverable(s):

- Summary of database in each quarterly report.
- Demonstration of the database.

Activity 5 – Development of a Probabilistic Model Decision Support System

A decision support system (DSS) will be developed using the data contained in the aforementioned database. Following development, the model will be capable of ingesting existing data or newly acquired data to determine the amount of risk of mudflows or rockslides, to transportation infrastructure, following a wildfire. As previously mentioned, the DSS that will be developed as part of this project will be capable of being imported into the RECOVER DSS to ensure more end-user usage.

Output(s):

- Development of Decision Support System.

Deliverable(s):

- Demonstration of the decision support system.
- Technical report entitled “The Development of a Remote Sensing Based Decision Support System to Determine the Amount of Risk to Transportation Infrastructure Following Wildfires”.

Activity 6 – Reporting and Publication

Quarterly reports will be submitted during the duration of the project. A summary of the progress of each activity, technical advances, barriers or limitations (if any), and proposed schedule for the future work will be included in each quarterly report. The final report will include the outcomes from each activity and outline observations collected during the project. Specifically, a detailed description of the key results and findings from each activity, a narrative of the development and implementation framework, a description of the decision support system, and a summary of the outreach and implementation efforts will be contained in the final report.

Peer-reviewed archival journal publications will be written to rapidly disseminate the finding obtained during the course of the project. These publications will serve two purposes, 1) the peer-review process will ensure the results are relevant and 2) the peer-review process will enable dissemination of the results to the stakeholders prior to the release of the final report. The acceptance of these articles will serve as an evaluation criteria for the proposed project.

Output(s):

- Regular communication of the project progress to the sponsor and stakeholder community.

Deliverable(s):

- Quarterly reports.
- Final report entitled “Remote Sensing Assessment System for Evaluating Risk to Transportation Infrastructure Following Wildfires”

3. TERM OF THE COOPERATIVE AGREEMENT

This Cooperative Agreement is valid for a period of twenty four (24) 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 \$1,143,807. OST-R will provide \$571,901 to support the project as described in this agreement. Recipient's proposed cost share amount for the project is \$571,906.

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 **March 7, 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 **August 26, 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 **March 7, 2014**, and in the Recipient's revised Cost Proposal, dated **August 26, 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

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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 **Richard A. Coffman**.

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
FAX: (202) 366-3671

B. Approved Project Proposal/Budget

The Recipient's approved proposal/application entitled, **Remote Sensing Based Assessment for Evaluating Risk to Transportation Infrastructure Following Wildfires** and accompanying Project Budget, SF 424 and SF424A, as finally revised on August 26, 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.

(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

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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 \$571,901 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 \$571,906. The Total Project Value (total Federal Price, plus total cost-share) is \$1,143,807.

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 15th 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), 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 upto 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.

| <u>Report</u> | <u>No. Copies</u> | <u>Submit To:</u> | <u>Due Date</u> |
|--|-------------------|-------------------|--|
| Deliverables as identified in Attachment 2 | 1 Electronic | PM | Delivery Times as stated in Agreement Attachment 3, Technical and Deliverable Milestone Schedule |

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| | | | |
|-------------------------|-----------------------------------|----|--|
| 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 Electronic | PM | 30 calendar days after the end of each quarter and 90 days after Project Completion |

Please copy Vasanth Ganesan (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

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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. 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.

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.

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,

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3) OMB Circular A-133, Audits of States, Local Governments and Non Profit Organizations. UNIVERSITY OF ARKANSAS currently is audited by the DHHS. Annual copies for recipients A-133 compliance audit will be posted to <http://finance.uark.edu> 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.

- 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"

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Attachments 1, 2, and 3 follow.

TEAM PROJECT ACTIVITIES

1. Formation of the Technical Advisory Committee (TAC), kickoff meeting (TAC members and members of the research team), and regular meetings (TAC members and members of the research team).
2. Development of: 1) website, 2) implementation plan, and 3) service providers for stakeholder outreach and a product/service provider business model.
3. Development of a ground-based remote sensing device.
4. Collection of data, creation and management of a database of soil properties in wildfire areas.
5. Development of a probabilistic model decision support system utilizing logistic regression.
6. Report on the progress of the project, discussions during the meetings with the TAC, and results obtained during the project through 1) quarterly reports to the project sponsor and 2) a final report to the project sponsor. Rapid dissemination of results, as obtained during the project, to the stakeholders through peer-reviewed conference proceedings and archival journal articles.

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Attachment 2
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PROJECT DELIVERABLES

1. "Development of TAC." Report. Due within 3 months of project start date.
2. "Development and Maintenance of Website" Website posted online within the first 3 months of the project and then maintained indefinitely.
3. "Quarterly Reports." Reports. Due at 3 month intervals after the project start date.
4. "Ground-based Remote Sensing Device." Demonstration. Due within 9 months of project start date.
5. "Implementation Plan, Fee Structure, and Utilization Rate." Report. Due within 12 months of the project start date.
6. "Users Manual for Ground-based Remote Sensing Device." Report. Due within 12 months of project start date.
7. "The Development of a Ground-based Remote Sensing System for Collecting Data to Determine the Amount of Risk to Transportation Infrastructure Following Wildfires." Report. Due within 12 months of the project start date.
8. "Database of Remotely Sensed Soil Properties." Demonstration and report. Due within 18 months and 21 months from the project start date, respectively.
9. "The Development of a Remote Sensing Based Decision Support System to Determine the Amount of Risk to Transportation Infrastructure Following Wildfires" Demonstration and Report. Due within 18 months and 24 months, respectively, from the project start date.
10. "Remote Sensing Assessment System for Evaluating Risk to Transportation Infrastructure Following Wildfires." Due within 24 months from the project start date.

| Technical and Deliverable Milestone Schedule | | | | | | | | |
|--|----------------------------|--|----------------|-----------------------------|---|--------------------|-----------------------------|------------------|
| Item No. | Task No. (per proposal) | Activity/Deliverable | Quarter No. | Expected Completion Date | Payable Milestone TITLE | Projected | Projected | Total |
| | | | | | | Federal Payment | Partner Cost- Sharing | |
| 1 | 1 | TAC kickoff meeting | 1 | 3 months | "Development of a TAC", report on TAC recommendations and feedback | \$3,250 | | \$3,250 |
| 2 | 2 | Create, publish, and maintain a project website; implementation plan development | 1 | 3 months/ 9 months | "Development and Maintenance of Website" report; "Implementation Plan, Fee Structure, and Utilization Rate" report. | \$3,563 | \$1,070 | \$4,633 |
| 3 | 3 | Develop ground-based remote sensing device | 1 | 9 months | "Ground Based Remote Sensing Device" demonstration of the device, "Users Manual for Ground-based Remote Sensing Device" report | \$104,963 | \$81,434 | \$186,397 |
| 4 | 4 | Collect archived remote sensing data and newly acquired remote sensing data | 1 | 21 months | "Database of Remotely Sensed Soil Properties" demonstration | \$2,064 | | \$2,064 |
| 5 | 5 | Develop probabilistic model and decision support system | 1 | 24 months | "The Development of a Remote Sensing Based Decision Support System to Determine the Amount of Risk to Transportation Infrastructure Following Wildfires" Preparation for Demonstration and Report | \$16,603 | \$12,981 | \$29,584 |
| 6 | 6 | Write technical papers on progress and results | 1 | 24 months | Submit conference proceeding or archival journal article | \$1,052 | \$1,070 | \$2,122 |
| 7 | 1 | 1st Quarterly Status Report | 1 | 3 months | Submit 1st quarterly report | \$3,608 | \$3,750 | \$7,358 |
| First Payable Milestone | | | 1 | 3 months | SUBTOTAL | \$135,104 | \$100,305 | \$235,409 |
| 8 | 2 | Create, publish, and maintain a project website; implementation plan development | 2 | 6 months | "Development and Maintenance of Website" report | \$1,073 | \$1,070 | \$2,143 |
| 9 | 3 | Develop ground-based remote sensing device | 2 | 9 months/ 12 months | "Ground Based Remote Sensing Device" demonstration, "Users Manual for Ground-based Remote Sensing Device" report | \$104,963 | \$81,434 | \$186,397 |
| 10 | 4 | Collect archived remote sensing data and newly acquired remote sensing data | 2 | 21 months | "Database of Remotely Sensed Soil Properties" demonstration and report | \$2,064 | | \$2,064 |
| 11 | 5 | Develop probabilistic model and decision support system | 2 | 24 months | "The Development of a Remote Sensing Based Decision Support System to Determine the Amount of Risk to Transportation Infrastructure Following Wildfires" Demonstration and Report | \$16,603 | \$12,981 | \$29,584 |
| 12 | 6 | Write technical papers on progress and results | 2 | 24 months | Submit conference proceeding or archival journal article | \$1,052 | | \$1,052 |
| 13 | 1 | 2nd Quarterly Status Report | 2 | 6 months | Submit 2nd quarterly report | \$1,311 | \$2,893 | \$4,205 |
| Second Payable Milestone | | | 2 | 6 months | SUBTOTAL | \$127,067 | \$98,378 | \$225,445 |

| Technical and Deliverable Milestone Schedule | | | | | | | | |
|--|-----------------------------------|---|--------------------|---------------------------------|---|----------------------------------|---------------------------------------|------------------|
| <u>Item No.</u> | <u>Task No.</u> (per proposal) | <u>Activity/Deliverable</u> | <u>Quarter No.</u> | <u>Expected Completion Date</u> | <u>Payable Milestone TITLE</u> | <u>Projected Federal Payment</u> | <u>Projected Partner Cost-Sharing</u> | <u>Total</u> |
| 14 | 2 | Create, publish, and maintain a project website; implementation plan development | 3 | 9 months | "Development and Maintenance of Website" report; "Implementation Plan, Fee Structure, and Utilization Rate" report. | \$1,073 | \$1,070 | \$2,143 |
| 15 | 3 | Develop ground-based remote sensing device | 3 | 9 months/ 12 months | "Ground Based Remote Sensing Device" demonstration, "Users Manual for Ground-based Remote Sensing Device" report | \$104,963 | \$81,434 | \$186,397 |
| 16 | 4 | Collect archived remote sensing data and newly acquired remote sensing data | 3 | 21 months | "Database of Remotely Sensed Soil Properties" demonstration and report | \$2,327 | | \$2,327 |
| 17 | 5 | Develop probabilistic model and decision support system | 3 | 24 months | "The Development of a Remote Sensing Based Decision Support System to Determine the Amount of Risk to Transportation Infrastructure Following Wildfires" Demonstration and Report | \$16,603 | \$12,981 | \$29,584 |
| 18 | 6 | Write technical papers on progress and results | 3 | 24 months | Submit conference proceeding or archival journal article | \$1,052 | | \$1,052 |
| 19 | 1 | 3rd Quarterly Status Report | 3 | 9 months | Submit 3rd quarterly report | \$1,311 | \$2,893 | \$4,205 |
| Third Payable Milestone | | | 3 | 9 months | SUBTOTAL | \$127,330 | \$98,378 | \$225,708 |
| 20 | 2 | Create, publish, and maintain a project website; implementation plan finalization | 4 | 12 months | "Development and Maintenance of Website" report; "Implementation Plan, Fee Structure, and Utilization Rate" report. | \$1,073 | \$1,070 | \$2,143 |
| 21 | 4 | Collect archived remote sensing data and newly acquired remote sensing data | 4 | 21 months | "Database of Remotely Sensed Soil Properties" demonstration and report | \$2,327 | \$3,211 | \$5,538 |
| 22 | 5 | Develop probabilistic model and decision support system | 4 | 24 months | "The Development of a Remote Sensing Based Decision Support System to Determine the Amount of Risk to Transportation Infrastructure Following Wildfires" Demonstration and Report | \$16,603 | \$12,981 | \$29,584 |
| 23 | 6 | Write technical papers on progress and results | 4 | 24 months | Submit conference proceeding or archival journal article | \$1,052 | | \$1,052 |
| 24 | 1 | 4th Quarterly Status Report | 4 | 12 months | Submit 4th quarterly report | \$1,410 | \$3,107 | \$4,517 |
| Fourth Payable Milestone | | | 4 | 12 months | SUBTOTAL | \$22,465 | \$20,370 | \$42,834 |
| 25 | 1 | TAC meeting | 5 | 15 months | "Development of a TAC", report on TAC recommendations and feedback | \$3,250 | | \$3,250 |

| Technical and Deliverable Milestone Schedule | | | | | | | | |
|--|-----------------------------------|---|--------------------|---------------------------------|---|----------------------------------|---------------------------------------|------------------|
| <u>Item No.</u> | <u>Task No.</u> (per proposal) | <u>Activity/Deliverable</u> | <u>Quarter No.</u> | <u>Expected Completion Date</u> | <u>Payable Milestone TITLE</u> | <u>Projected Federal Payment</u> | <u>Projected Partner Cost-Sharing</u> | <u>Total</u> |
| 26 | 2 | Create, publish, and maintain a project website; employ implementation plan | 5 | 15 months | "Development and Maintenance of Website" report; "Implementation Plan, Fee Structure, and Utilization Rate" report. | \$1,105 | \$1,103 | \$2,208 |
| 27 | 4 | Collect archived remote sensing data and newly acquired remote sensing data | 5 | 21 months | "Database of Remotely Sensed Soil Properties" demonstration and report | \$15,484 | \$73,643 | \$89,127 |
| 28 | 5 | Develop probabilistic model and decision support system | 5 | 24 months | "The Development of a Remote Sensing Based Decision Support System to Determine the Amount of Risk to Transportation Infrastructure Following Wildfires" Demonstration and Report | \$22,863 | \$21,249 | \$44,112 |
| 29 | 6 | Write technical papers on progress and results | 5 | 24 months | Submit conference proceeding or archival journal article | \$2,167 | \$1,103 | \$3,269 |
| 30 | 1 | 5th Quarterly Status Report | 5 | 15 months | Submit 5th quarterly report | \$3,671 | \$4,005 | \$7,676 |
| Fifth Payable Milestone | | | 5 | 15 months | SUBTOTAL | \$48,540 | \$101,102 | \$149,642 |
| 31 | 2 | Create, publish, and maintain a project website; employ implementation plan | 6 | 18 months | "Development and Maintenance of Website" report; "Implementation Plan, Fee Structure, and Utilization Rate" report. | \$1,105 | \$1,103 | \$2,208 |
| 32 | 4 | Collect archived remote sensing data and newly acquired remote sensing data | 6 | 21 months | "Database of Remotely Sensed Soil Properties" demonstration and report | \$15,484 | \$72,541 | \$88,025 |
| 33 | 5 | Develop probabilistic model and decision support system | 6 | 24 months | "The Development of a Remote Sensing Based Decision Support System to Determine the Amount of Risk to Transportation Infrastructure Following Wildfires" Demonstration and Report | \$22,863 | \$21,249 | \$44,112 |
| 34 | 6 | Write technical papers on progress and results | 6 | 24 months | Submit conference proceeding or archival journal article | \$2,167 | \$1,764 | \$3,931 |
| 35 | 1 | 6th Quarterly Status Report | 6 | 18 months | Submit 6th quarterly report | \$1,452 | \$3,123 | \$4,575 |
| Sixth Payable Milestone | | | 6 | 18 months | SUBTOTAL | \$43,071 | \$99,779 | \$142,849 |
| 36 | 2 | Create, publish, and maintain a project website; employ implementation plan | 7 | 21 months | "Development and Maintenance of Website" report; "Implementation Plan, Fee Structure, and Utilization Rate" report. | \$1,105 | \$1,103 | \$2,208 |
| 37 | 4 | Collect archived remote sensing data and newly acquired remote sensing data | 7 | 21 months | "Database of Remotely Sensed Soil Properties" demonstration and report | \$8,713 | | \$8,713 |

| Technical and Deliverable Milestone Schedule | | | | | | | | |
|--|-----------------------------------|---|--------------------|---------------------------------|---|----------------------------------|---------------------------------------|------------------|
| <u>Item No.</u> | <u>Task No.</u> (per proposal) | <u>Activity/Deliverable</u> | <u>Quarter No.</u> | <u>Expected Completion Date</u> | <u>Payable Milestone TITLE</u> | <u>Projected Federal Payment</u> | <u>Projected Partner Cost-Sharing</u> | <u>Total</u> |
| 38 | 5 | Develop probabilistic model and decision support system | 7 | 24 months | "The Development of a Remote Sensing Based Decision Support System to Determine the Amount of Risk to Transportation Infrastructure Following Wildfires" Demonstration and Report | \$22,863 | \$21,249 | \$44,112 |
| 39 | 6 | Write technical papers on progress and results | 7 | 24 months | Submit conference proceeding or archival journal article | \$3,375 | | \$3,375 |
| 40 | 1 | 7th Quarterly Status Report | 7 | 21 months | Submit 7th quarterly report | \$1,452 | \$3,343 | \$4,795 |
| Seventh Payable Milestone | | | 7 | 21 months | SUBTOTAL | \$37,508 | \$25,694 | \$63,202 |
| 41 | 2 | Create, publish, and maintain a project website; employ implementation plan | 8 | 24 months | "Development and Maintenance of Website" report; "Implementation Plan, Fee Structure, and Utilization Rate" report. | \$1,105 | \$1,103 | \$2,208 |
| 42 | 5 | Develop probabilistic model and decision support system | 8 | 24 months | "The Development of a Remote Sensing Based Decision Support System to Determine the Amount of Risk to Transportation Infrastructure Following Wildfires" Demonstration and Report | \$22,863 | \$21,249 | \$44,112 |
| 43 | 6 | Write technical papers and final report on progress and results | 8 | 24 months | Submit conference proceeding or archival journal article; "Remote Sensing Assessment System for Evaluating Risk to Transportation Infrastructure Following Wildfires" | \$5,398 | \$2,205 | \$7,603 |
| 44 | 12 | 8th Quarterly Status Report | 8 | 24 months | Submit 8th quarterly report | \$1,452 | \$3,343 | \$4,795 |
| Eighth Payable Milestone | | | 8 | 24 months | SUBTOTAL | \$30,818 | \$27,900 | \$58,718 |
| | | Prepare and present paper at public event | n/a | TBD | Prepare and present paper at public event | | | |
| GRAND TOTALS | | | | | | \$68,326 | \$53,594 | \$121,920 |

//////////////////////////////////End of Cooperative Agreement # OASRTRS-14-H-UARK//////////////////////////////////

Scope of Work:

Personnel from Idaho State University will assist with the completion of Activity 2 – Development of Implementation Plan, Establishment of Service Providers, and Establishment of Website and Activity 5 – Development of a Probabilistic Model Decision Support System (as defined in the Cooperative Agreement). In particular, the landslide risk decision support system that is developed by the PI and Co-PI will be included into the cloud- and web-based Rehabilitation Capability Convergence for Ecosystem Recovery (RECOVER) decision support system that is currently operated by the GIS center at Idaho State University and sponsored by NASA Goddard Flight Center (with end-users including: the Idaho Department of Transportation, the Idaho Department of Land, the Bureau of Land Management, the United States Forest Service, the United States Geological Survey, and the Federal Emergency Management Agency).

COST PROPOSAL

Table 1. Personnel hourly rates (Idaho State).

| Labor Category Items | GIS Director (Calendar year) | GIS Systems Admin (Calendar year) | Student GIS Technician |
|----------------------|------------------------------|-----------------------------------|------------------------|
| Monthly Salary | \$ 6,751 | \$ 3,614 | \$ 1,077 |
| Hours Per Month | 173.33 | 173.33 | 71.78 |
| Unloaded Hourly Rate | \$ 38.95 | \$ 20.85 | \$ 15.00 |
| Fringe (@X%) | 34.0% | 45.0% | 8.9% |
| Indirect Cost (@X%) | 42.0% | 42.0% | 42.0% |
| Loaded Hourly Rate | \$ 74.12 | \$ 42.93 | \$ 23.20 |

Table 2a. USDOT workload by task.

| Category | Name | Task 1 | Task 2 | Task 3 | Task 4 | Task 5 | Task 6 |
|------------------------|------------------------------|----------|----------|----------|----------|------------|----------|
| GIS Director | Keith T Weber @ \$74.12/Hour | 0 | 0 | 0 | 0 | 65 | 0 |
| GIS Systems Admin | Kindra Serr @ \$42.93/Hour | 0 | 0 | 0 | 0 | 0 | 0 |
| Student GIS Technician | TBD @ \$20.42Hour | 0 | 0 | 0 | 0 | 646 | 0 |
| | | | | | | 0 | 0 |
| | Total | 0 | 0 | 0 | 0 | 711 | 0 |

Table 2b. Cost-share workload by task.

| Category | Name | Task 1 | Task 2 | Task 3 | Task 4 | Task 5 | Task 6 |
|------------------------|------------------------------|----------|----------|----------|----------|------------|----------|
| GIS Director | Keith T Weber @ \$74.12/Hour | 0 | 0 | 0 | 0 | 130 | 0 |
| GIS Systems Admin | Kindra Serr @ \$42.93/Hour | 0 | 0 | 0 | 0 | 253 | 0 |
| Student GIS Technician | TBD @ \$20.42Hour | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 0 | 0 | 0 | 0 | 383 | 0 |

COST PROPOSAL

Table 3a. USDOT itemized personnel and fringe by tasks.

| Category | Cost Item | Hourly Rate | Second Year | | | | | | Total |
|------------------------|--------------------------------|-------------|-------------|---------|---------|---------|--------------|---------|--------------|
| | | | Task 1 | Task 2 | Task 3 | Task 4 | Task 5 | Task 6 | |
| | | | Y Hours | Y Hours | Y Hours | Y Hours | Y Hours | Y Hours | |
| GIS Director | Keith T Weber, PI | | 0 | 0 | 0 | 0 | 65 | 0 | 65 |
| | Unloaded Rate | \$ 38.95 | \$ - | \$ - | \$ - | \$ - | \$ 2,531.75 | \$ - | \$ 2,531.75 |
| | Fringe | 34% | \$ - | \$ - | \$ - | \$ - | \$ 860.80 | \$ - | \$ 860.80 |
| | Indirect Cost | 42.00% | \$ - | \$ - | \$ - | \$ - | \$ 1,424.87 | \$ - | \$ 1,424.87 |
| | Loaded Rate | \$ 74.11 | \$ - | \$ - | \$ - | \$ - | \$ 4,817.41 | \$ - | \$ 4,817.41 |
| GIS System Admin | Kindra Serr | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Unloaded Rate | \$ 20.85 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| | Fringe | 45.0% | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| | Indirect Cost | 42.00% | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| | Loaded Rate | \$ 42.93 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Student GIS Technician | Name (TBD) | | 0 | 0 | 0 | 0 | 646 | 0 | 646 |
| | Unloaded Rate | \$ 15.00 | \$ - | \$ - | \$ - | \$ - | \$ 9,690.00 | \$ - | \$ 9,690.00 |
| | Fringe | 8.9% | \$ - | \$ - | \$ - | \$ - | \$ 862.41 | \$ - | \$ 862.41 |
| | Indirect Cost | 42.00% | \$ - | \$ - | \$ - | \$ - | \$ 4,432.01 | \$ - | \$ 4,432.01 |
| | Loaded Rate | \$ 23.20 | \$ - | \$ - | \$ - | \$ - | \$ 14,984.42 | \$ - | \$ 14,984.42 |
| Total | Total Direct Labor Cost | | \$ - | \$ - | \$ - | \$ - | \$ 12,221.75 | \$ - | \$ 12,221.75 |
| | Fringe (@A%) | | - | - | - | - | 1,723.21 | - | \$ 1,723.21 |
| | Indirect Cost (@B%) | | - | - | - | - | 5,856.88 | - | \$ 5,856.88 |
| | Total Labor | | \$ - | \$ - | \$ - | \$ - | \$ 19,801.84 | \$ - | \$ 19,801.84 |

Table 3b. Cost-share itemized personnel and fringe by tasks.

| Category | Cost Item | Hourly Rate | Second Year | | | | | | Total |
|------------------------|--------------------------------|-------------|-------------|---------|--------|--------|--------------|---------|--------------|
| | | | Task 1 | Task 2 | Task 3 | Task 4 | Task 5 | Task 6 | |
| | | | Y Hours | Y Hours | | | | Y Hours | |
| GIS Director | Keith T Weber, PI | | 0 | 0 | 0 | 0 | 130 | 0 | 130 |
| | Unloaded Rate | \$ 38.95 | 0.00 | 0.00 | 0.00 | 0.00 | 5063.50 | 0.00 | \$ 5,063.50 |
| | Fringe | 21% | - | - | - | - | 1,063.34 | - | \$ 1,063.34 |
| | Indirect Cost | 25.00% | - | - | - | - | 1,531.71 | - | \$ 1,531.71 |
| | Loaded Rate | \$ 58.91 | \$ - | \$ - | \$ - | \$ - | \$ 7,658.54 | \$ - | \$ 7,658.54 |
| GIS System Admin | Kindra Serr | | 0 | 0 | 0 | 0 | 253 | 0 | 253 |
| | Unloaded Rate | \$ 20.85 | \$ - | \$ - | \$ - | \$ - | \$ 5,275.05 | \$ - | \$ 5,275.05 |
| | Fringe | 21.0% | \$ - | \$ - | \$ - | \$ - | \$ 2,373.77 | \$ - | \$ 2,373.77 |
| | Indirect Cost | 25.00% | \$ - | \$ - | \$ - | \$ - | \$ 2,215.52 | \$ - | \$ 2,215.52 |
| | Loaded Rate | \$ 31.54 | \$ - | \$ - | \$ - | \$ - | \$ 10,861.33 | \$ - | \$ 10,861.33 |
| Student GIS Technician | Name (TBD) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Unloaded Rate | \$ 15.00 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| | Fringe | 8.9% | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| | Indirect Cost | 25.00% | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| | Loaded Rate | \$ 20.42 | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Total | Total Direct Labor Cost | | \$ - | \$ - | \$ - | \$ - | \$ 10,338.55 | \$ - | \$ 10,338.55 |
| | Fringe (@A%) | | - | - | - | - | 3,437.11 | - | \$ 3,437.11 |
| | Indirect Cost (@B%) | | - | - | - | - | 3,747.23 | - | \$ 3,747.23 |
| | Total Labor | | \$ - | \$ - | \$ - | \$ - | \$ 18,519.87 | \$ - | \$ 18,519.87 |

COST PROPOSAL

Budget Justification

Idaho State University

Landslide Model integration into the RECOVER DSS*Keith T. Weber; ISU/GIS TReC***Idaho State University- GIS Training and Research Center****Notice of Restriction on Use and Disclosure of Proposal Information**

The information (data) contained in this section of the proposal constitutes information that is financial and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offeror, be used or disclosed other than for evaluation purposes; provided, however, that in the event a contract (or other agreement) is awarded on the basis of this proposal, the Government shall have the right to use and disclose this information (data) to the extent provided in the contract (or other agreement).

Budget

| Item | Project cost | Match |
|----------------------------------|------------------|------------------|
| Senior/Key Personnel | | |
| Principal Investigator | \$ 2,503 | \$ 5,005 |
| Other Personnel | | |
| Systems Administrator | | \$ 5,060 |
| Student GIS technician | \$ 9,690 | |
| SUB-TOTAL | \$ 12,193 | \$ 10,065 |
| Benefits | | |
| PI (fringe) | \$ 526 | \$ 1,051 |
| PI (health insurance) | \$ 330 | \$ 659 |
| Sys Admin (fringe) | | \$ 1,063 |
| Sys Admin (health insurance) | | \$ 1,283 |
| Student GIS technician | \$ 862 | |
| SUB-TOTAL | \$ 1,718 | \$ 4,056 |
| Academic Support | | |
| Student GRA | \$ - | \$ - |
| SUB-TOTAL | \$ - | \$ - |
| Equipment | | |
| none | \$ - | \$ - |
| SUB-TOTAL | \$ - | \$ - |
| Travel | | |
| none | \$ - | \$ - |
| SUB-TOTAL | \$ - | \$ - |
| Participant support costs | | |
| Supplies and materials | \$ 99 | \$ - |
| Teleconferencing costs | \$ 112 | \$ - |
| SUB-TOTAL | \$ 211 | \$ - |
| Direct costs | \$ 14,121 | \$ 14,121 |
| Indirect costs | \$ 5,931 | \$ 5,931 |
| TOTAL | \$ 20,052 | \$ 20,052 |

COST PROPOSAL

Budget justification

Senior/Key Personnel

The principal investigator and project supervisor for this sub-contract is Keith T. Weber. Weber will be partially funded (\$2,502 or 65 hours of his time) by this proposal (approximately 3% of his annual salary) and will be responsible for the day-to-day management of the project, project logistics, coordination, spatial data infrastructure, and student research assistant supervision and mentoring. Weber will devote an additional 130 hours to this project, paid by state funds and used as match (\$5,005)

Other Personnel

One GIS Systems Administrator (Kindra Serr) will assist with server functions and security for this project (\$5,060) and devote approximately 250 hours as match. Ms. Serr is funded primarily by the GIS TReC and will be responsible for assisting in the development of web services and maintaining the GIS TReC's servers and workstations.

One Student GIS technician will be selected for this project and devote nearly 650 hours to web service development, landslide data transfer from the parent site as well as system integration into RECOVER. This person (to be determined) will be the primary person responsible for day-to-day project tasks (\$9690, 19 hours per week). This student (either graduate or undergraduate) will work toward completion of their selected degree program while at ISU.

Benefits

Benefits (\$1,718) have been calculated using Idaho State University's standard rates (21% of salaries and wages for full-time permanent employees and employees working more than half-time; 8.9% for students and other employees working less than half-time). Health insurance has also been included for all eligible employees funded by this proposal. Insurance paid by this proposal has been pro-rated based upon the percent personnel time devoted to this project (e.g., Keith T. Weber is funded at approximately 4%, so 4% of his insurance has been requested in this proposal). In addition, benefits accrued as part of matched salaries is also included as part of the total match for this sub-contract (\$4,056).

Overall, fringe benefits (including health insurance) constitute 34% of salaries and wages for Keith T. Weber, 45% for Kindra Serr, and 8.9% for the Student GIS Technician.

Equipment

No equipment is requested.

Travel

No travel funding is requested.

Other Direct Costs

Office supplies requested to support this project totaling \$299. This includes basic office supplies (paper, pens, notepads, etc. [\$99]) as well as teleconference and web conference costs (\$200).

COST PROPOSAL

Indirect Charges

Indirect charges (\$5,931) have been calculated using Idaho State University's standard rate of 42% of modified direct costs (\$14,121). Indirect charges have been calculated in the same fashion for the provided match.

Total Direct Costs

Total direct costs to Idaho State University's GIS TReC are \$14,121 and total project costs (direct costs and indirect charges) are \$20,052.

Matching support

A total of \$20,052 is being provided as match for this sub-contract. This includes salaries, benefits, and calculated indirect costs as described above and detailed in the budget table.

COST PROPOSAL
Budget Summary
Idaho State University

| | | | | | DOT Request | Cost | DOT Request | Cost | Total | Total | Total |
|--|--|--|--|--|-------------|--------|--------------|--------------|--------------|--------------|--------------|
| | | | | | Amount | Share | Amount | Share | DOT Request | Cost | Project |
| | | | | | Year 1 | Year 1 | Year 2 | Year 2 | Amount | Share | Value |
| Personnel | | | | | | | | | | | |
| Faculty 1 | | | | | | | 2503 | 5005 | 2503 | 5005 | 7508 |
| Staff 1 | | | | | | | | 5060 | | 5060 | 5060 |
| Grad. Assist. 1 | | | | | | | 9690 | | 9690 | | 9690 |
| Subtotal Personnel | | | | | | | 12193 | 10065 | 12193 | 10065 | 22258 |
| Fringe Benefits | | | | | | | | | | | |
| Faculty - Summer | | | | | | | 856 | 1710 | 856 | | 856 |
| Faculty - Academic | | | | | | | | 2346 | | 2346 | 2346 |
| Grad. Asst | | | | | | | 862 | | 862 | 0 | 862 |
| Subtotal Fringe Benefits | | | | | | | 1718 | 4056 | 1718 | 2346 | 4064 |
| Total Personnel & Fringe Benefits | | | | | | | 13911 | 14121 | 13911 | 12411 | 26322 |
| Supplies | | | | | | | 211 | | 211 | | 211 |
| Subtotal Other Direct Costs | | | | | | | 211 | | 211 | | 211 |
| Total All Direct Costs | | | | | | | 14122 | 14121 | 14122 | 14121 | 28243 |
| Facilities & Administrative (F&A) Costs | | | | | | | | | | | |
| F&A Cost - University 1 (42%) | | | | | | | 5931 | 5931 | 5931 | 5931 | 11862 |
| Total F&A Costs | | | | | | | 5931 | 5931 | 5931 | 5931 | 11862 |
| Grand Total | | | | | | | 20052 | 20052 | 20052 | 20052 | 40104 |

VENDOR NAME
 VENDOR STREET ADDRESS
 VENDOR CITY, STATE

REQUEST FOR PAYMENT

University of Arkansas
 Office of Sponsored Projects Accounting
 305 Administration Building
 Fayetteville, AR 72701

Date _____

RE: Subaward/MOA # _____

Project Title:

Description of Services

| | Current Budget | Current Expenses _____ to _____ | Total Expenses To-Date |
|------------------------------------|----------------|------------------------------------|---------------------------|
| Salaries | | | |
| Position Title & Name of Employee | \$ _____ | \$ _____ | \$ _____ |
| Fringe Benefits | | | |
| Percentage | \$ _____ | \$ _____ | \$ _____ |
| Materials & Supplies | | | |
| Group by Type | \$ _____ | \$ _____ | \$ _____ |
| Travel | | | |
| Individual's Name & type of travel | \$ _____ | \$ _____ | \$ _____ |
| Equipment | | | |
| List Individual Items Purchased | \$ _____ | \$ _____ | \$ _____ |
| Other Direct Costs | | | |
| Group by Type | \$ _____ | \$ _____ | \$ _____ |
| Participant Support | | | |
| | \$ _____ | \$ _____ | \$ _____ |
| Indirect Costs (%) | | | |
| | \$ _____ | \$ _____ | \$ _____ |
| TOTAL | \$ _____ | \$ _____ | \$ _____ |

All payments requested are for appropriate purposes and in accordance with the agreement as set forth in the application and award documents. The documentation required by current Federal and State regulations for these costs is on file and will remain available for audit by University of Arkansas and the appropriate Federal and State auditors for the period required by regulations.

Please Remit To:

This Request is Authorized for Payment

Office of Sponsored Projects Accounting
 University of Arkansas
 305 Administration Building
 Fayetteville, AR 72701

Agenda
4th Annual Arkansas Commercialization Retreat
May 31 – June 2, 2015
Winthrop Rockefeller Conference Center

Sunday, May 31

- 1:15 – 2:00 Check-in for freshmen
- 2:00 – 3:30 Welcome and introductions – Carol Reeves, Associate Vice-Provost for Entrepreneurship, UAF
- What is Intellectual Property and why it is important
Dr. Christine Daugherty, VP Sustainable Food Production, Tyson Foods
- 3:30 – 3:45 break
- 3:45 – 4:45 University IP disclosure procedures and processes; revenue sharing policies
- Jeff Amerine, Founding Principal, Startup Junkie Consulting
Nancy Gray, Director, UAMS BioVentures UAMS
Brian Rogers, Director, Catalyst, ASU
Jeff Stinson, Director, Center of Innovation & Commerce, UALR
- 4:45 – 5:45 Investments 101
- Jeff Stinson, Director, Center of Innovation & Commerce, UALR; Executive Director, Fund for Arkansas' Future
Self-funded ventures – Jay Gandy, Professor and Chair, Department of Environmental and Occupational Health, UAMS
Arkansas government resources for building a business – Steve Stanley, VP for Research and Commercialization, ASTA
- 6:15 – 7:15 Dinner
- 7:15 – 8:15 How we did it – stories from student-driven university start-ups
- Ellen Brune, CEO, Boston Mountain Biotech
Douglas Hutchings, CEO, Picasolar
Corey Thompson, CEO, WattGlass
- 8:15 – 9:30 Networking reception

Monday, June 1

- 8:00 – 9:00 Breakfast
- 9:00 – 10:15 How we did it – stories from faculty-driven university start-ups
Ralph Henry and Mike Owens, Co-Founders, InterveXion Therapeutics
Amy Hester, CSO and Founder, HD Nursing
- 10:15 – 10:45 break, e-mail, networking
- 10:45 – 11:45 The VIC model to building businesses based on university IP
Calvin Goforth, CEO, VIC
- (11:30 – 12:00 Check-in for Alumni)
- 12:00 - 1:00 Lunch
- 1:00 – 5:30 Federal government funding and the LeanLaunchPad approach
Bob Storey, Chairman/CEO, Vixiar Medical; Chairman, OsteoVantage
Executive in Residence, Johns Hopkins University and the University of
Maryland
National Instructor, NSF/NIH Innovation Corps Program
- 6:00 – 7:00 Dinner
- 7:00 – 8:00 Bring in the Professionals: Round I
Scott Osborn, Associate Professor, Biological and Agricultural Engineering,
UAF; Co-Founder, BlueInGreen
Clete Brewer, CEO, BlueInGreen
- 8:00 – 9:30 Networking Reception

Tuesday, June 2

7:30 – 8:30 Breakfast

8:30 – 9:00 The Arkansas Entrepreneurship Ecosystem

Jeff Amerine, Founding Principal, Startup Junkie Consulting

9:00 – 9:45 Bring in the Professionals: Round II

Rush Deacon, CEO, Safe Foods

9:45 – 10:00 Break

10:00 – 11:00 Arkansas Universities' Role in Economic Development

Jerry Adams, President/CEO, Arkansas Research Alliance

Carolina Cruz-Neira, Director of the Emerging Analytics Center and Donaghey Professor, UALR

Alan Mantooh, Distinguished Professor, Electrical Engineering, UAF;

11:00 – 11:15 Wrap-Up and Departure



AEG 2015
ASSOCIATION OF ENVIRONMENTAL & ENGINEERING GEOLOGISTS
58th Annual Meeting

Dear Mr. Salazar,

AEG is pleased to inform you that your abstract has been accepted for the 2015 Annual Meeting.

Presentation Date: Thursday, September 24, 2015

Technical Session: Technical Session #9: Geotechnical Site Characterization Part I

Moderator: TBD

Presentation Time: 8:40-9:00 am

Presentation Location: We will be sending the room assignment and final details in July

Presentation Instructions:

- Your Presentation time is 20 minutes including Q&A and transition to the next presenter. We will have speaker timers in the room to help you keep track of your time. Green is on from 0-18 minutes, Yellow 18 to 20 minutes, and Red comes on at 20 minutes when your allotted time is complete, please keep your presentation to the 20 minutes.
- We will provide a projector, laptop, speaker timer and laser pointer in the room.
- You will have several opportunities to load your presentation onto the session laptop. Please name your presentation 2-AEGTS9 Salazar. Please bring a copy of your PowerPoint on a USB Drive to the session just in case.
 - Option 1: Email me your presentation prior to September 15, 2015 . We have a Dropbox account if your PowerPoint is really large. Let me know if you would like me to send you an invitation to the AEG Dropbox Account.
 - Option 2: You can bring your USB Drive to registration and they will load your presentation onto the master drive and I will make sure it is transferred to your session laptop.
 - Option 3: Load your presentation onto the session laptop at the Speaker/Moderator Breakfast the morning of your presentation.

Your abstract will be included in the Program With Abstracts as follows, please email me any additional edits by June 21 , 2015.

Ultra-Violet Near-Infrared Reflectance Spectroscopy for Remote Measurement of Soil Water Potential

Salazar, Sean, University of Arkansas, ssalazar@uark.edu; Cyrus Garner, cxcg021@uark.edu; Richard Coffman, rick@uark.edu; Thomas Oommen, toommen@uark.edu (TS #9)

Soil water potential is an important parameter in the hydro-mechanical behavior of unsaturated soils. However, existing methods of obtaining measurements of soil water potential have demonstrable disadvantages. Traditional methods of obtaining unsaturated soil properties, including laboratory based methods (chilled mirror hygrometer, Tempe cell, and pressure plate extractor [PPE]) and in-situ methods (tensiometer, heat dissipation sensor, electrical resistance sensor), provide only point-wise measurements and consequently suffer from low temporal and spatial resolution and limited soil water potential measurement range. Therefore, a remote sensing technique was employed to measure the soil water potential using ultra-violet to near-infrared (UV-NIR) diffuse reflectance spectroscopy at the soil surface without contacting the soil. A partial least squares (PLS) statistical technique was utilized to correlate the effects of soil suction to the diffuse reflectance spectrum in the UV-NIR range (350-2500 nm). In order to validate the relationship, calibration reflectance spectra were collected for 60 specimens consisting of three soil types and prepared at different soil water potential values. PPE were used to prepare specimens between 10 kPa and 1500 kPa. The soil water characteristic curves were determined for each soil using the aforementioned PPE specimens and a WP4 chilled mirror hygrometer. Measured and predicted values of soil water potential showed good correlation. The PLS regression conducted on the 60 calibration specimens explained 98 percent of the variance expressed in the specimen reflectance spectra. The remote sensing technique presented has the capability to provide soil water potential measurements at the field scale with high spatial and temporal resolution.

Your session convener will be contacting you in August for a final confirmation. Be sure to register for the meeting at www.aegannualmeeting.org. Please register for the Speaker/Moderator Breakfast from 7-8:30am on the day of your presentation. It is very important to attend the breakfast to meet your fellow presenters and convener, review last minute details and allow your PowerPoint talk to be loaded on the designated laptop for that day. To make hotel reservations click on the following link: [Hotel Reservations](#). Group Rate: \$179/night

Please contact us if you have any questions or if you are not able to attend the meeting for your presentation. It is very difficult for us to replace your talk and rearrange the schedule so if at all possible, please provide a backup presenter. We look forward to seeing you in September.

Sincerely,
Heather Clark
AEG Meeting Manager
Heather@ageweb.org, 303-518-0618

AEG 2015 Technical Program Co-Chairs
Matt Morris, mmorris@gfnet.com
Brian Greene, bgreene@gfnet.com
Abdul Shakoar, ashakoar@kent.edu

**Civil Engineering Department
University of Arkansas**

Matching Funds Certification

DATE: July 7, 2015

TO: Research Accounting
Research and Sponsored Programs

FROM: Richard Coffman, Project Principal Investigator

RE: Remote Sensing Based Assessment for Evaluating Risk to Transportation Infrastructure Following Wildfires

CCN: (0402-12501-21-0000)

This letter certifies radar usage fees for the University of Arkansas 2015 Fiscal Year (July 2014 through June 2015) in the amount of \$75,493.20.

As described in the proposal to USDOT, the University of Arkansas Gamma Portable Radar Interferometer version II (GPRI-II) device was upgraded from a single-polarization radar system to a full-polarization radar system. To accomplish this upgrade, the GPRI-II device was sent from the University of Arkansas to the Gamma Remote Sensing Factory in Bern, Switzerland, on November 13, 2014. The device was returned from the Gamma Remote Sensing factory on March 8, 2015. During the upgrade, the device was unavailable to researchers at the University of Arkansas. Therefore, a usage rate of \$356.10 per day for 176 days (total expense of \$62,673.60) was assessed to the USDOT sponsored, Remote Sensing Based Assessment for Evaluating Risk to Transportation Infrastructure Following Wildfires, project. The rate of \$356.10 per day was proposed on a one-time basis, for the upgrade, because the University of Arkansas GPRI-II radar was being upgraded for this project. The typical rate of \$178.05 per hour of inactive use and \$534.15 per hour of active use will be used for the remainder of the project.

From May 25 through May 30, 2015, the upgraded GPRI-II system was deployed at the Turrell Arkansas Test Site in Turrell, Arkansas. The device was utilized to measure the amount of moisture within the vegetation and soil at the test site and to determine if any movement was observed within the Interstate interchange (I-55 and US-63) following blasting within the soil. Radar images were collected, while the radar was in active use, during a six-hour period on Tuesday, May 26, and during a six-hour period on Friday, May 29. The device was in inactive use for the remainder of the week. Therefore, 12 hours of active use (\$534.15 per hour) and 36 hours of inactive use (\$178.05 per hour) were expended during the use of the GPRI-II device at the Turrell Arkansas Test Site (total expense of \$12,819.60).

The University of Arkansas hereby certifies that the above mentioned costs, as described herein, meet or exceed the requirements set forth in the guidelines that were followed in preparing the budget for

the proposal and have not previously been certified by myself or another party for this or any other purpose.

Certified True and Correct.



Richard Coffman
Project Principal Investigator

ASTRONOMICS / CHRISTOPHERS, LTD.

680 24th AVENUE SW, NORMAN, OK 73069

www.astronomics.com • e-mail: questions@astronomics.com

Telephone: (800) 422-7876 • Fax: (405) 447-3337

DATE 4/23/15

INVOICE 41004-1
41004-1-1
1 of 1

SOLD TO

Rick Coffman
University Of Arkansas
321 Admin
Fayetteville, AR 72701

SHIP TO

Rick Coffman
University Of Arkansas
321 Admin
Fayetteville, AR 72701

| | | | |
|------------------|--------------------|--------------------|-----------------|
| CUSTOMER NUMBER | CUSTOMER TELEPHONE | WAREHOUSE LOCATION | TERMS |
| 114807 | (479) 575-8767 | | PAID IN FULL |
| PURCHASE ORDER # | SALES I.D. | SOURCE CODE | SHIPPING METHOD |
| | MCB | | Fedex Home |

MESSAGE

| QUANTITY | | | ITEM # | DESCRIPTION | UNIT PRICE | EXTENSION |
|----------|---------|--------|--------|--|--------------|-----------|
| ORDERED | SHIPPED | ON B/O | | | | |
| 1 | 1 | 0 | 3210RU | Meade 8" LX200-ACF UHTC 0810-60-03 | 2,500.00 | 2,500.00 |
| | | | | Items Total | | 2,500.00 |
| | | | | | TOTAL | 2,500.00 |
| | | | | | Inv. Remit | 2,500.00 |
| | | | | | PAID IN FULL | 0.00 |
| | | | | The Visa account ending with 9322, in the name of University Of Arkansas, will be charged \$2,500.00. Thank You | | |

No returns after 30 days: All returns within 30 days are less freight and a 15% minimum restocking fee. No returns on books, star charts, or opened software. Merchandise remains the property of Astronomics/Christophers, Ltd. until paid for in full.



The University of Arkansas is not exempt from sales /use tax except for those items specifically exempted by State law.

The laws of the State of Arkansas shall govern this Purchase Order.

| Purchase Order | | |
|----------------------------|-------------------|--------------|
| Purchase Order Date | PO/Reference No. | Revision No. |
| Jun 29, 2015 | 836300 | 0 |
| Contact Information | | |
| Contact | Sandra Hancock | |
| Email | shancock@uark.edu | |
| Phone | +1 (479) 575-6025 | |

Order acceptance instructions:

**Complete list of terms can be seen at: <http://procurement.uark.edu/terms.pdf>
 Mark all packages and freight documents with purchase order number. Invoice must show purchase order number. The University of Arkansas is not exempt from sales/use tax except for those items specifically exempted by State law. Any change(s) to purchase order must be approved by Procurement prior to shipment. If Federal Funding, including Federal Transit Administration (FTA) funds are used in any procurement by the University of Arkansas, certain contract clauses in UA terms and conditions now apply based on the nature and dollar value of the procurement.**

| Supplier Information | | Delivery Information | |
|------------------------|---------------------------------------|--|-----------------------|
| Supplier Name | Beaver Lake Distribution Inc. | Delivery Address | |
| Address | 14960 Hwy 62 Garfield, AR 72732 US | University of Arkansas | |
| F.O.B./Freight | Destination | Attn: | Sandra Hancock |
| Supplier Payment Terms | 0, Net 30 | Room: | 4190 |
| | | Bell Engineering Center 800 W DICKSON STREET Fayetteville, AR 72701 United States | |
| | | Shipping Information | |
| | | Delivery Date | Jun 28, 2015 |
| | | Expedite | No |
| | | Ship Via | Best Carrier-Best Way |

Notes to Supplier

| Line No. | Product Description | Catalog No. | Size / Packaging | Unit Price | Quantity | Ext. Price |
|----------|------------------------|-------------------------|------------------|-----------------|----------|-----------------|
| 1 of 1 | Cargo trailer | | 1/EA | 2,450.00 USD | 1 EA | 2,450.00 USD |
| | <u>ADDITIONAL INFO</u> | | | | | |
| | Unit Price | 2,450.00 | | | | |
| | Hold For: | Sandra Hancock (5-6025) | | | | |
| | Taxable | No | | | | |
| | Capital Expense | No | | | | |

| | |
|----------------|-----------------------------|
| Commodity Code | 25180000 |
| | Vehicle bodies and trailers |

Invoices must be submitted to the Billing Address indicated below to assure timely payment.

| | |
|----------|---------------------|
| Subtotal | 2,450.00 |
| Tax1 | 0.00 |
| Shipping | 0.00 |
| Handling | 0.00 |
| Total | 2,450.00 USD |

Billing Information

To avoid payment delays,
invoice must include the PO
referenced above

Contract *no value*

Quote number

Billing Address

University of Arkansas
University of Arkansas
Accounts Payable
321 Administration Bldg
Fayetteville, AR 72701
United States

Beaver Lake Distribution, Inc.

14960 E Highway 62
 Garfield, AR 72732
 479-451-2020
 877-733-5150 (Toll Free)

Sales Order

| | |
|----------|----------|
| Date | S.O. No. |
| 6/5/2015 | 199 |

| |
|---|
| Name / Address |
| UNIVERSITY OF ARDEPT OF CIVIL ENGINEERING 4190 BELL ENGINEERING CENTER FAYETTEVILLE, AR 72701 |

| |
|---------|
| Ship To |
| |

| | |
|----------|---------|
| P.O. No. | Project |
| | |

| Item | Description | Ordered | Rate | Amount |
|-----------------|--|---------|----------|----------|
| CARGO TRAILE... | LARK VT6X10SA V-NOSE DRD-B 6 X 10 SINGLE AXLE V-NOSE CARGO TRAILER DOUBLE REAR DOOR BLACK REGULAR HEIGHT: ROOF VENT V-NOSE THIS TRAILER MUST BE IN GARFIELD BY JUNE 26 | | 2,450.00 | 2,450.00 |

| | | |
|-------------------------|--|------------|
| Subtotal | | \$2,450.00 |
| Sales Tax (7.5%) | | \$0.00 |
| Total | | \$2,450.00 |



The University of Arkansas is not exempt from sales /use tax except for those items specifically exempted by State law.

The laws of the State of Arkansas shall govern this Purchase Order.

| Purchase Order | | |
|----------------------------|-------------------|--------------|
| Purchase Order Date | PO/Reference No. | Revision No. |
| May 21, 2015 | 832851 | 0 |
| Contact Information | | |
| Contact | Sandra Hancock | |
| Email | shancock@uark.edu | |
| Phone | +1 (479) 575-6025 | |

Order acceptance instructions:

Complete list of terms can be seen at: <http://procurement.uark.edu/terms.pdf>
Mark all packages and freight documents with purchase order number. Invoice must show purchase order number. The University of Arkansas is not exempt from sales/use tax except for those items specifically exempted by State law. Any change(s) to purchase order must be approved by Procurement prior to shipment. If Federal Funding, including Federal Transit Administration (FTA) funds are used in any procurement by the University of Arkansas, certain contract clauses in UA terms and conditions now apply based on the nature and dollar value of the procurement.

| Supplier Information | | Delivery Information | |
|------------------------|--|--|-----------------------|
| Supplier Name | DB Schenker Inc. | Delivery Address | |
| Address | PO Box 2307 Carol Stream, IL 60132 US | University of Arkansas | |
| F.O.B./Freight | Destination | Attn: | Richard Coffman |
| Supplier Payment Terms | 0, Net 30 | Room: | 4190 |
| | | Bell Engineering Center 800 W DICKSON STREET Fayetteville, AR 72701 United States | |
| | | Shipping Information | |
| | | Delivery Date | May 22, 2015 |
| | | Expedite | No |
| | | Ship Via | Best Carrier-Best Way |

Notes to Supplier

| Line No. | Product Description | Catalog No. | Size / Packaging | Unit Price | Quantity | Ext. Price |
|----------|-------------------------------|--------------------------------------|------------------|-----------------|----------|-----------------|
| 1 of 1 | Gamma Remote Sensing shipment | | 1/EA | 1,784.71 USD | 1 EA | 1,784.71 USD |
| | ADDITIONAL INFO | | | | | |
| | Unit Price | 1,784.71 | | | | |
| | Taxable | Yes | | | | |
| | Capital Expense | No | | | | |
| | Commodity Code | 78100000 Mail and cargo transport | | | | |

Invoices must be submitted to the Billing Address indicated below to assure timely payment.

| | |
|----------|---------------------|
| Subtotal | 1,784.71 |
| Tax1 | 174.01 |
| Shipping | 0.00 |
| Handling | 0.00 |
| Total | 1,958.72 USD |

Billing Information

To avoid payment delays,
invoice must include the PO
referenced above

Contract *no value*

Quote number

Billing Address

University of Arkansas
University of Arkansas
Accounts Payable
321 Administration Bldg
Fayetteville, AR 72701
United States

| | | | |
|--|--|--------------------------|---|
| Shipper's Name and Address GAMMA REMOTE SENSING AG WORBSTRASSE 225 3073 GUEMLIGEN | | Shipper's Account Number | Not negotiable Air Waybill Issued by SCHENKER SWITZERLAND LTD. CH-3008 BERNE SWITZERLAND IN A CAPACITY AS CONTRACTING CARRIERS |
|--|--|--------------------------|---|

| | | | |
|---|--|----------------------------|---|
| Consignee's Name and Address UNIVERSITY OF ARKANSAS DEPARTMENT OF CIVIL ENGINEERING 4190 BELL ENGINEERING CENTER PROF. COFFMAN US-FAYETTEVILLE, AR 72701 | | Consignee's Account Number | It is agreed that the goods described herein are accepted in apparent good order and condition (except as noted) for carriage SUBJECT TO THE CONDITIONS OF CONTRACT ON THE REVERSE HEREOF. THE SHIPPER'S ATTENTION IS DRAWN TO THE NOTICE CONCERNING CARRIERS' LIMITATION OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value of carriage and paying a supplemental charge if required. MAWB 001-9453 2981 |
|---|--|----------------------------|---|

| | | | |
|--|------------|--|--|
| Issuing Carrier's Agent Name and City | | Accounting Information FREIGHT PREPAID DAP UNIVERSITY OF ARKANSAS EXCL. DUTIES/TAXES/CUSTOM CLEARANCE | |
| Agent's IATA Code | Account No | | |
| Airport of Departure (Addr. of First Carrier) and Requested Routing BERNE | | ECD -- | |

| to | By First Carrier | Routing and Destination | to | by | to | by | Currency | CHGS Code | WT/VAL PPD | Other PPD | Declared Value of Carriage | Declared Value of Customs |
|-----|------------------|-------------------------|-----|----|-----|----|----------|-----------|------------|-----------|----------------------------|---------------------------|
| JFK | AA | | MIA | AA | DFW | AA | CHF | | PP | PP | NVD | NCV |

| Airport of Destination | Flight/Date | For Carrier Use only | Flight/Date | Amount of Insurance | INSURANCE - If Carrier offers insurance, and such insurance is requested in accordance with conditions on reverse hereof, indicate amount to be insured in figures in box marked 'Amount of Insurance'. |
|------------------------|-------------------|----------------------|-------------|---------------------|---|
| DALLAS/FORT WORTH | AA 65/07AA1085/08 | | | XXX | |

Handling Information SHIPPERS REFERENCE / C.WERNER e-freight:
 MARKS: UNIVERSITY OF ARKANSAS
 ENCL : INVOICE, PACKING LIST

| No of Pieces RCP | Gross Weight | kg lb | Rate Class | Commodity Item No | Chargeable Weight | Rate | Charge | Total | Nature and Quantity of Goods (incl. Dimension or Volume) |
|--|--------------|-------|------------|-------------------|-------------------|------|--------|--------|---|
| 2 | 130.0 | K N | | | 191.0 | | 1.80 | 343.80 | PORTABLE RADAR INTERFEROMETER NOT RESTRICTED DIMS: 1/120x60x100 cm 1/220x55x35 cm HS CODE: 8526.1000 |
| CONSIGNEE CONTACT: PROF RICK COFFMAN PH: +1 479 935 6453 RETURN SHIPMENT AFTER REPAIR/UPGRADE | | | | | | | | | |
| 3RD FLIGHT: AA 1085/09 MIA | | | | | | | | | |
| SCHENKERjetcargo Business - DOOR-TO-DOOR | | | | | | | | | |
| 2 | 130.0 | K | | | | | | 343.80 | 1.144 cbm |

| | | | | | |
|---------|---------------|---------|-------------------|---------------------|-------------------|
| Prepaid | Weight Charge | Collect | Other Charges | DUJELSURCH 136.50 C | SCC-SEC F 26.00 C |
| 343.80 | | | SECUR.CHK 80.00 C | | |

| | |
|------------------|--|
| Valuation Charge | |
| Tax | |

| | | |
|---------------------------------|--------|--|
| Total Other Charges Due Agent | | Shipper certifies that the particulars on the face hereof are correct and that insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations. SCHENKER SWITZERLAND LTD. LARISSA MUTTI REF: 8203500355 STT: 75670006607738 |
| Total Other Charges Due Carrier | 242.50 | |

| | | |
|---------------|---------------|---|
| Total Prepaid | Total Collect | SCHENKER SWITZERLAND LTD. AS CARRIER |
| 586.30 | | 06.03.2015 09:36 BERNE |

| | | |
|---------------------------------------|------------------------------|--|
| Currency Conversion Rates | CC Charges in Dest. Currency | Executed on (Date) at (Place) Signature of Issuing Carrier |
| | | XXXXXXXXXX |
| For Carrier's Use only at Destination | Charges at Destination | Total Collect Charges |

NOTICE CONCERNING CARRIER'S LIMITATION OF LIABILITY

If the carriage involves an ultimate destination or stop in a country other than the country of departure, the Montreal Convention or the Warsaw Convention may be applicable to the liability of the Carrier in respect of loss of, damage or delay to cargo. Carrier's limitation of liability in accordance with those Conventions shall be as set forth in subparagraph 4 unless a higher value is declared.

CONDITIONS OF CONTRACT

1. In this contract and the Notices appearing hereon:

CARRIER includes the air carrier issuing this air waybill and all carriers that carry or undertake to carry the cargo or perform any other services related to such carriage.

SPECIAL DRAWING RIGHT (SDR) is a Special Drawing Right as defined by the International Monetary Fund.

WARSAW CONVENTION means whichever of the following instruments is applicable to the contract of carriage:
the Convention for the Unification of Certain Rules Relating to International Carriage by Air, signed at Warsaw, 12 October 1929;
that Convention as amended at The Hague on 28 September 1955;
that Convention as amended at The Hague 1955 and by Montreal Protocol No. 1, 2, or 4 (1975) as the case may be.

MONTREAL CONVENTION means the Convention for the Unification of Certain Rules for International Carriage by Air, done at Montreal on 28 May 1999.
- 2./2.1 Carriage is subject to the rules relating to liability established by the Warsaw Convention or the Montreal Convention unless such carriage is not "international carriage" as defined by the applicable Conventions.
- 2.2 To the extent not in conflict with the foregoing, carriage and other related services performed by each Carrier are subject to:
 - 2.2.1 applicable laws and government regulations;
 - 2.2.2 provisions contained in the air waybill, Carrier's conditions of carriage and related rules, regulations, and timetables (but not the times of departure and arrival stated therein) and applicable tariffs of such Carrier, which are made part hereof, and which may be inspected at any airports or other cargo sales offices from which it operates regular services. When carriage is to/from the USA, the shipper and the consignee are entitled, upon request, to receive a free copy of the Carrier's conditions of carriage. The Carrier's conditions of carriage include, but are not limited to:
 - 2.2.2.1 limits on the Carrier's liability for loss, damage or delay of goods, including fragile or perishable goods;
 - 2.2.2.2 claims restrictions, including time periods within which shippers or consignees must file a claim or bring an action against the Carrier for its acts or omissions, or those of its agents;
 - 2.2.2.3 rights, if any, of the Carrier to change the terms of the contract;
 - 2.2.2.4 rules about Carrier's right to refuse to carry;
 - 2.2.2.5 rights of the Carrier and limitations concerning delay or failure to perform service, including schedule changes, substitution of alternate Carrier or aircraft and rerouting.
- 3 The agreed stopping places (which may be altered by Carrier in case of necessity) are those places, except the place of departure and place of destination, set forth on the face hereof or shown in Carrier's timetables as scheduled stopping places for the route. Carriage to be performed hereunder by several successive Carriers is regarded as a single operation.
- 4 For carriage to which the Montreal Convention does not apply, Carrier's liability limitation for cargo lost, damaged or delayed shall be 19 SDRs per kilogram unless a greater per kilogram monetary limit is provided in any applicable Convention or in Carrier's tariffs or general conditions of carriage.
- 5./5.1 Except when the Carrier has extended credit to the consignee without the written consent of the shipper, the shipper guarantees payment of all charges for the carriage due in accordance with Carrier's tariff, conditions of carriage and related regulations, applicable laws (including national laws implementing the Warsaw Convention and the Montreal Convention), government regulations, orders and requirements.
- 5.2 When no part of the consignment is delivered, a claim with respect to such consignment will be considered even though transportation charges thereon are unpaid.
- 6./6.1 For cargo accepted for carriage, the Warsaw Convention and the Montreal Convention permit shipper to increase the limitation of liability by declaring a higher value for carriage and paying a supplemental charge if required.
- 6.2 In carriage to which neither the Warsaw Convention nor the Montreal Convention applies Carrier shall, in accordance with the procedures set forth in its general conditions of carriage and applicable tariffs, permit shipper to increase the limitation of liability by declaring a higher value for carriage and paying a supplemental charge if so required.
- 7./7.1 In cases of loss of, damage or delay to part of the cargo, the weight to be taken into account in determining Carrier's limit of liability shall be only the weight of the package or packages concerned.
- 7.2 Notwithstanding any other provisions, for "foreign air transportation" as defined by the U.S. Transportation Code:
 - 7.2.1 in the case of loss of, damage or delay to a shipment, the weight to be used in determining Carrier's limit of liability shall be the weight which is used to determine the charge for carriage of such shipment; and
 - 7.2.2 in the case of loss of, damage or delay to a part of a shipment, the shipment weight in 7.2.1 shall be prorated to the packages covered by the same air waybill whose value is affected by the loss, damage or delay. The weight applicable in the case of loss or damage to one or more articles in a package shall be the weight of the entire package.
- 8 Any exclusion or limitation of liability applicable to Carrier shall apply to Carrier's agents, employees, and representatives and to any person whose aircraft or equipment is used by Carrier for carriage and such person's agents, employees and representatives.
- 9 Carrier undertakes to complete the carriage with reasonable dispatch. Where permitted by applicable laws, tariffs and government regulations, Carrier may use alternative carriers, aircraft or modes of transport without notice but with due regard to the interests of the shipper. Carrier is authorized by the shipper to select the routing and all intermediate stopping places that it deems appropriate or to change or deviate from the routing shown on the face hereof.
- 10 Receipt by the person entitled to delivery of the cargo without complaint shall be prima facie evidence that the cargo has been delivered in good condition and in accordance with the contract of carriage.
- 10.1 In the case of loss of, damage or delay to cargo a written complaint must be made to Carrier by the person entitled to delivery. Such complaint must be made:
 - 10.1.1 in the case of damage to the cargo, immediately after discovery of the damage and at the latest within 14 days from the date of receipt of the cargo;
 - 10.1.2 in the case of delay, within 21 days from the date on which the cargo was placed at the disposal of the person entitled to delivery.
 - 10.1.3 in the case of non-delivery of the cargo, within 120 days from the date of issue of the air waybill, or if an air waybill has not been issued, within 120 days from the date of receipt of the cargo for transportation by the Carrier.
- 10.2 Such complaint may be made to the Carrier whose air waybill was used, or to the first Carrier or to the last Carrier or to the Carrier, which performed the carriage during which the loss, damage or delay took place.
- 10.3 Unless a written complaint is made within the time limits specified in 10.1 no action may be brought against Carrier.
- 10.4 Any rights to damages against Carrier shall be extinguished unless an action is brought within two years from the date of arrival at the destination, or from the date on which the aircraft ought to have arrived, or from the date on which the carriage stopped.
- 11 Shipper shall comply with all applicable laws and government regulations of any country to or from which the cargo may be carried, including those relating to the packing, carriage or delivery of the cargo, and shall furnish such information and attach such documents to the air waybill as may be necessary to comply with such laws and regulations. Carrier is not liable to shipper and shipper shall indemnify Carrier for loss or expense due to shipper's failure to comply with this provision.
- 12 No agent, employee or representative of Carrier has authority to alter, modify or waive any provisions of this contract.

SCHENKER INC DALLAS

2400 ESTERS BLVD
US-DALLAS, TX 75261
USA

Schenker Contact:
MICHELLE SALLIS /+1 214 702 7060



Date.....:03/29/2015

Shipment #....:7852506299
S.T.T. #.....:75670006607738
Flight.....:AA 0065/07
HAWB Number...:BRN-30006783
MAWB Number...:001-94532981
Dep./Des.....:BRN /DFW
Pieces.....: 2
Gross Weight.: 130.0 Kg
Chargeable Wt: 191.0 Kg
Entry No.....:32212413508
Outside HAWB..

INVOICE No.:2520402442

Mail To:
UNIVERSITY OF ARKANSAS

2650 N YOUNG AVE
US-FAYETTEVILLE, AR 72704

Bill To: 000477815
UNIVERSITY OF ARKANSAS
2650 N YOUNG AVE
US-FAYETTEVILLE, AR 72704

Importer:
UNIVERSITY OF ARKANSAS
2650 N YOUNG AVE
US-FAYETTEVILLE, AR 72704

Shipper:
GAMMA REMOTE SENSING AG

3073 GUEMLIGEN
Nature Of Goods: PORTABLE RADAR

Ultimate Consignee:
UNIVERSITY OF ARKANSAS
2650 N YOUNG AVE
US-FAYETTEVILLE, AR 72704

| CHARGES | INVOICE AMOUNT | |
|------------------------------|----------------|----------------|
| MERCHANDISE PROCESSING FEE | USD | 304.71 |
| CUSTOMS CLEARANCE | USD | 110.00 |
| SINGLE TRANSACTION BOND PREP | USD | 50.00 |
| SINGLE TRANSACTION BOND | USD | 1320.00 |
| TOTAL INVOICE AMOUNT | USD | 1784.71 |

If you are importer of record, payment to the broker will not relieve you of the liability for Customs charges (duties, taxes, or other debts owed Customs) in the event the charges are not paid by the broker. Therefore, if you pay by check, Customs charges may be paid with a separate check payable to "U.S. Customs Service" which will be delivered to Customs by the broker.

INVOICE DUE DATE 15 DAYS FROM INVOICE DATE
PLEASE REMIT PAYMENT TO :
SCHENKER INC., P.O. BOX 2307, CAROL STREAM, IL 60132-2307

98217PC

www.dbschenkerforms.com

{Rev. 03/05}

Mu'-use #9 19 80

GENERAL TERMS & CONDITIONS OF SERVICE

All services performed by the legal entity named on the front of this document (hereinafter called the "Company") for the Customer, which term shall include the person or entity for which services are performed, its agents and/or representatives, including, but not limited to, shippers, exporters, importers, senders, receivers, owners, consignors, consignees, carriers, secured parties, warehousemen, insurers and underwriters, transferors or transferee of shipments, will be handled by the Company on the following terms and conditions:

1. Application of Terms and Conditions. Company and Customer agree that these terms and conditions of service constitute a legally binding contract. Customer acknowledges that the terms and conditions of the Company's standard international air waybill, ocean bill of lading, warehouse terms and conditions, master customs power of attorney and its currently effective tariffs are hereby incorporated by reference. The Customer acknowledges and agrees that it is responsible to provide notice and a copy of these terms and conditions to all of its agents or representatives.
2. Standing of Company. The Company acts as an independent contractor, except with respect to the performance of the following services where Company acts as an "agent" of Customer: entry and release of goods; post entry services; the securing of export licenses; export documentation filing for the Customer; other dealings with government agencies in behalf of Customer.
3. Services by Third Parties. Unless the Company carries, stores, or otherwise physically handles the shipment, and loss, damage, expense or delay occurs during such activity, the Company assumes no liability as a carrier and shall not be held responsible for any loss, damage, expense or delay to the goods to be forwarded or imported except as provided in paragraph 10 and subject to the limitations of paragraph 11 below, but undertakes only to use reasonable care in the selection of carriers, truckmen, lightermen, forwarders, customs brokers, agents, warehousemen and others to whom it may entrust the goods for transportation, cartage, handling and/or delivery and/or storage or otherwise. When the Company carries, stores or otherwise physically handles the shipment, it does so subject to the limitation of liability set forth in paragraph 10 below unless a separate bill of lading, air waybill or other contract is issued by the Company, in which event the terms thereof shall govern.
4. Liability Limitations of Third Parties. The Company is authorized to select and engage carriers, truckers, lightermen, forwarders, customs brokers, agents, warehousemen and others, as required, to transport, store, deal with and deliver the goods, all of whom shall be considered as the agents of the Customer, and the goods may be entrusted to such agencies subject to all conditions as to limitation of liability for forwarders, customs brokers, agents, warehousemen and others. The Company shall under no circumstances be liable for any loss, damage, expense or delay to the goods for any reason whatsoever when said goods are in custody, possession or control of third parties selected by the Company to forward, enter and clear, transport or render other services with respect to such goods. In the event that a person or entity hired by Company is determined to be the agent of the Company, the agent's liability is ascertained according to the provisions of these terms and conditions, particularly as set forth in paragraphs 10 and 11 below, as if they were a party hereto.
5. Choosing Routes or Agents. Unless express instructions in writing are received from the Customer and accepted by the Company, the Company has complete freedom in choosing the means, route and procedure to be followed in the handling, transportation and delivery of the goods.
6. Quotations Not Binding. Quotations as to fees, rates of duty, freight charges, insurance fees or other charges given by the Company to the Customer are for informational purposes only and are subject to change without notice and shall not under any circumstances be binding upon the Company unless the Company in writing specifically undertakes the handling or transportation of the shipment at a specific rate.
7. Duty to Furnish Information (a) On an import shipment at a reasonable time prior to entering of the goods through U.S. Customs, the Customer shall furnish to the Company invoices in proper form and other documents necessary or useful in the preparation of the U.S. Customs entry and also, such further information as may be sufficient to establish inter alia, the dutiable value, the classification, the country of origin, quantity, weight, admissibility and the genuineness of the merchandise and any mark or symbol associated with it, and the Customer's right to import and/or distribute the merchandise, pursuant to U.S. law or regulation. If the Customer fails to furnish in a timely manner such information or documents, in whole or in part, as may be required to complete U.S. Customs entry or comply with U.S. laws or regulations or if the information or documents furnished are inaccurate, incomplete, or otherwise insufficient, the Company shall be obligated only to use the best judgment in connection with the shipment and in no instance shall be charged with knowledge by the Customer of the true circumstances to which such inaccurate, incomplete, omitted or otherwise insufficient information or document pertains. Where a bond is required by U.S. Customs to be given for the production of any document or the performance of any act, the Customer shall be deemed bound by the term of the bond notwithstanding the fact that the bond has been executed by the Company as principal, it being understood that the Company entered into such understanding at the instance and on behalf of the Customer, and the Customer shall indemnify and hold the Company harmless for the consequences of any breach of the terms of the bond. (b) On an export shipment at a reasonable time prior to exportation of the shipment, the Customer shall furnish to the Company the commercial invoice in proper form and number, a proper consular declaration, weights, measures, values and other information in the language of and as may be required by the laws and regulations of the U.S. and the country of destination of the goods. (c) On an export or import shipment, the Company shall not in any way be responsible or liable for increased duty, penalty, fine or expense unless, caused by the negligence or other fault of the Company, in which event its liability to the Customer shall be governed by the provisions of these terms. The Customer shall be bound by and warrant the accuracy of all invoices, documents and information furnished to the company by the Customer or its agent for export, entry or other purposes and the Customer agrees to indemnify and hold the Company harmless against any increased duty, penalty, fine or expense including but not limited to attorneys' fees, costs, and expenses resulting from any inaccuracy, incomplete statement, omission or any failure to make timely presentation of required invoices, documents and information, even if not due to any negligence of the Customer. 8. Declaring Higher Valuation. Inasmuch as the truckers, carriers, warehousemen and others to whom the goods are entrusted (collectively, the "Third Parties") usually limit their liability for loss or damage unless a higher value is declared and the charge based on such higher value is agreed to by any such Third Party, unless the Company receives specific written instructions from the Customer to pay such higher charges based on valuation and any such Third Party accepts such higher declared value, any valuation placed by the Customer on the goods shall be considered solely for export or customs purposes and the goods will be delivered to the Third Party subject to the limitations of liability set forth herein in paragraphs 10 and 11 below with respect to any claim against the Company and subject to the provisions of paragraph 4 above.
9. Insurance. The Company will make reasonable efforts to effect marine, fire, theft and other insurance upon the goods only after specific written instructions have been received and accepted by the Company in sufficient time prior to shipment from the point of origin, and the Customer at the same time states specifically the kind and amount of insurance to be placed. The Company does not undertake or warrant that such insurance can or will be placed. Unless the Customer has its own open marine policy and instructs the Company to effect insurance under such policy, insurance is to be effected with one or more insurance companies or other underwriters to be selected by the Company. Any insurance placed shall be governed by the certificate or policy issued and will only be effective when accepted by such insurance companies or underwriters. Should an insurer dispute its liability for any reason, the insured shall have recourse against the insurer only and the Company shall not be under any responsibility of liability in relation thereto, notwithstanding that the premium upon the policy may not be at the same rates as that charged or paid to the Company by the Customer, or that the shipment was insured under a policy in the name of the Company. Customer agrees to pay all insurance fees and any costs of the Company for arranging the same. If for any reason the goods are held in warehouse, or elsewhere, the same will not be covered by any insurance, unless the Company receives and accepts written instructions from the Customer. Unless specifically agreed in writing, the Company assumes no responsibility to effect insurance on any export or import shipment, which it does not handle. Company shall have no obligation to procure insurance in behalf of Customer except as specifically provided for herein.
10. Limitation of Liability for Loss; Warranty Disclaimer. (a) The Customer agrees that the Company shall only be liable for its negligent acts that are the direct and proximate cause of injury to the Customer, including any loss, damage, expense or delay to the goods. Subject to any applicable law, statute, or regulation, such liability shall be limited as follows: (i) If the customer declares a value in advance of the transit and pays applicable additional charges, Company's liability shall be the lesser of the amount of any damage actually sustained or the declared value. ii) If the Customer does not declare a value and pay applicable additional charges, the Company's liability shall be the lesser of: A) the amount of any damage actually sustained or; B) \$50 or the weight of the actual piece count lost or damaged in pounds multiplied by \$50, whichever is greater, plus the amount of the Company's transportation charges applicable to that part of the shipment lost or damaged beyond economical repair. iii) Damages for delay are limited as per Company's currently effective tariffs, available on Company's website. (b) Customer agrees that the Company shall, in no event, be liable for consequential, indirect, incidental, punitive, statutory or special damages, including, but not limited to, loss of profits, income, utility, interest or loss of market, even if Company has been put on notice of the possibility of such damages. (c) Except as specifically set forth herein, Company makes no express or implied warranties in connection with its services. (d) Other limits of liability may apply to ocean transit, international air transit, warehousing, customs entry and other services. These liability limits can be found in the Company's terms and conditions for these services located on the Company's website or in the Company's tariffs.
11. Limitation of Actions. (a) It is the responsibility of the Customer to note in writing any damage or exception to the freight at the time of delivery. Receipt by the person entitled to delivery of the shipment without complaint is prima facie evidence that the same has been delivered in good condition and in accordance with the contract of carriage. (b) Subject to any applicable law, statute or regulation, the Company shall not be liable under paragraph 10 for any claims for: (i) damage or loss discovered by the Customer after delivery and after a clear receipt has been given to the Company, unless a claim is reported in writing to the Company within 15 days after delivery of the shipment with privilege to the Company to inspect the shipment and its container(s) and packing material within 15 days after receipt of such notice; (ii) damage, loss, or delay in all other circumstances, unless made in writing and received by the Company within 120 days after the date of acceptance of the shipment by the Company. (c) No claims with respect to a shipment, any part of which is received by the Consignee, will be entertained until all transportation charges have been paid. (d) Subject to any applicable law, regulation or treaty, all suits against Company must be filed and properly served on Company as follows: (i) for claims arising out of ocean transportation, within one (1) year from the date of delivery or the date the goods should have been delivered; (ii) for claims arising out of air transportation, within two (2) years from the date of the loss; (iii) for claims arising out of preparation and/or submission of an import entry, within seventy-five (75) days from the date of liquidation of the entry; (iv) for any and all other claims of any other type, within two (2) years from the date of the loss or damage. (e) Claims for overcharges or duplicate billings must be made in writing and received by Company within 180 days from the acceptance date of the shipment by Company or they are time-barred. Lawsuits for overcharges or duplicate billings must be filed no later than one year from the acceptance date of the shipment by Company.
12. Advancing Money. The Company shall not be obliged to incur any expense, guarantee payment or advance any money in connection with the importing, entering, forwarding, transporting, insuring, storing or cooping of the goods, unless monies sufficient to satisfy such expense, payment, or advance is previously provided to the Company by the Customer on demand. The Company shall not be under an obligation to advance freight charges, customs duties or taxes, insurance charges, or other charges owed to third parties by the Customer on any shipment, nor shall any advance by the Company be construed as a waiver of the provisions hereof. In the event that the Company should advance any such monies to any person or entity that subsequently refunds all or any portion thereof to the Customer, and the Customer at the time of the refund, has not reimbursed the Company for those monies, then any portion of the refund corresponding to such unpaid, advanced monies, and any interest paid thereon, shall be deemed the exclusive property of the Company to which the Customer shall have no claim, and which the Customer shall return to the Company immediately upon receipt.
13. Indemnification for Freight, Duties, etc. In the event that a carrier, other person or any governmental agency makes a claim or institutes legal action against the Company for freight, duties, fines, penalties, liquidated damages or other money due arising from a shipment of goods of the Customer, the Customer agrees to indemnify and hold the Company harmless for any amount the Company may be required to pay such carrier, other person or governmental agency together with reasonable expenses, including but not limited to attorney fees, costs, and expenses incurred by the Company in connection with defending such claim or legal action and obtaining reimbursement from the Customer. The confiscation or detention of the goods by any governmental authority shall not affect or diminish the liability of the Customer to the Company to pay all charges or other money due promptly on demand.
14. C.O.D. Shipments. Goods received with Customer's or other person's instructions to "Collect on Delivery" (C.O.D.) by drafts or otherwise, or to collect on any specified terms by time drafts or otherwise, are accepted by the Company only upon the express understanding that it will exercise reasonable care regarding such instructions, and the Company will not be responsible for any refusal by a bank or consignee to pay for a shipment, or for any act, omission, default, suspension, insolvency or want of care, negligence, or fault of any bank, correspondent, carrier or agent, nor for any delay in remittance lost in exchange, or loss during transmission, or while in the course of collection.
15. General Lien on any Property. The Company shall have a general and continuing lien on any and all property (and documents relating thereto) of the Customer, either in its actual or constructive possession, custody or control or en route, for all claims for monies owed to Company, including without limitation charges, expenses or advances incurred by the Company, in connection with any shipments of the Customer, including prior shipments. Company shall provide written notice to Customer of its intent to exercise such lien, the exact amount of monies due and owing, as well as any ongoing storage or other charges; Customer shall notify all parties having an interest in its shipment of Company's rights and/or the exercise of such lien. Unless, within thirty (30) days after receiving the notice of lien, Customer posts cash or a letter of credit at sight, or, if the amount due is in dispute, an acceptable bond equal to 110 percent of the value of the total amount due, in favor of the Company, guaranteeing payment of the monies owed, plus all storage charges accrued or to be accrued, the Company may sell at public or private sale, in accordance with governing law the goods, wares and/or merchandise, or so much thereof as may be necessary to satisfy such lien, and apply the net proceeds of such sale to the payment of the monies owed to the Company. Any surplus from such sale shall be transmitted to the Customer, and the Customer shall be liable for any deficiency in the sale.
16. Compensation of Company. The compensation of the Company for its services shall be included with and is in addition to the rates and charges of all carriers and other agencies selected by the Company to transport and deal with the goods and such compensation shall be exclusive of any brokerage, commissions, dividends or other revenue received by the Company from carriers, insurers and others in connection with the shipment. Except as otherwise agreed in writing between the Company and Customer, the fuel surcharge on air transportation services will be charged by Company in accordance with the Company's Surcharge Index. In any referral for collection or action against the Customer for monies due to the Company, including but not limited to any action for the enforcement of any provision of the Master Customs Power of Attorney between the Customer and the Company, upon recovery by the Company, the Customer shall pay the expenses of collection and/or litigation, including a reasonable attorney's fees, costs and expenses.
17. No Responsibility for Governmental Requirements. It is the responsibility of the Customer to know and comply with the requirements, laws and regulations of any Federal, State and/or local agencies pertaining in any way to the merchandise, including, but not limited to, regulations, laws, and requirements pertaining to marking, classification, licensing, transporting hazardous materials, export controls, and any other transporting, importing, or exporting requirements. The Company shall not be responsible for action taken or fines or penalties assessed by any governmental agency against the shipment because of the failure of the Customer to comply with the law or the requirements or regulations of any governmental agency or with a notification issued to the Customer by any such agency.
18. Indemnity against Liability Arising from the Importation of Merchandise. The Customer agrees to indemnify and hold the Company harmless from any claims and/or liability arising from the importation of merchandise and/or any conduct of the Customer which violates any Federal, state and/or other laws or regulations and further agrees to indemnify and hold the Company harmless against any and all liability, loss, damages, costs, claims and/or expenses, including but not limited to reasonable attorney's fees, costs and expenses which the Company may hereafter incur, suffer or be required to pay by reason of such claims and/or liability. In the event that any such action, suit or proceeding is brought against the Company, the Company shall give notice in writing to the Customer by mail at its address on file with the Company. Upon receipt of such notice, the Customer at its own expense, and, at the Company's discretion, in cooperation with the Company's designated counsel, shall defend against such action and take all steps as may be necessary or proper to prevent the obtaining of a judgment and/or order against the Company.
19. No Duty To Maintain Records For Customer. Customer acknowledges that pursuant to Sections 508 and 509 of the Tariff Act, as amended, (19 U.S.C. sections 1508 and 1509) it has the duty and is solely liable for maintaining all records required under the Customs and/or other Laws and Regulations of the United States; unless otherwise agreed to in writing, the Company shall only keep such records that it is required to maintain by Statute and/or Regulations, but not as a "recordkeeper" or "record-keeping agent" for Customer.
20. Obtaining Binding Rulings, Filing Protests, etc. Unless requested by Customer in writing and agreed to by Company in writing, Company shall be under no obligation to undertake any pre- or post-Customs release action, including, but not limited to, obtaining binding rulings, advising of liquidations, filing of petitions and/or protests, etc.
21. Preparation and Issuance of Bills of Lading. Where Company prepares and/or issues a bill of lading, Company shall be under no obligation to specify thereupon the number of pieces, packages and/or cartons, etc.; unless specifically requested to do so in writing by Customer or its agent and Customer agrees to pay for same. Company shall be entitled to rely upon and use the cargo weight supplied by Customer.
22. Shipment Screening. All shipments may, at Company's option or as required by government regulation, be screened and/or opened and inspected without liability to Company. The Customer consents to such screening and understands that this document containing its consent shall be maintained by Company and may be made available to the government regulators upon request.
23. Carmack Amendment Waiver. If the Carmack Amendment ("Carmack") to the Interstate Commerce Act is compulsorily applicable to any stage of the transportation, then the Customer expressly agrees to a waiver of the Carmack provisions to the extent legally permissible. In the event Carmack applies, the Customer must file a written notice of claim for loss, damage or delay no later than nine months after the cargo is delivered and the Customer must file a lawsuit no later than two years from the date the Company denies the claim.
24. No Modification or Amendment Unless Written. These terms and conditions of service may only be modified, altered or amended in writing signed by both Customer and Company; any attempt to unilaterally modify, alter or amend same shall be null and void.
25. Severability. In the event that any Paragraph and/or portion hereof is found to be invalid and/or unenforceable, then in such event the remainder hereof shall remain in full force and effect.
26. Construction of Terms and Venue. These terms and conditions of service shall be construed according to the laws of the State of New York, without giving consideration to principles of conflict of law. The Company and the Customer (a) agree that any legal proceeding relating to the services performed by the Company shall be brought only in a court of competent jurisdiction in the State of New York, and (b) irrevocably consent to the jurisdiction of any such court in New York State.



Phone: 508-580-1660 Fax: 508-583-8989
 F.I.D. 04-2217450
 Brockton, MA 02301-5566
 15 Jonathan Drive Unit 4

www.krohn-hite.com

Invoice

| | | |
|-----------|-----------|-----------|
| Territory | Date | Invoice # |
| AR | 6/10/2015 | 20012721 |

Bill To

University of Arkansas
 Attn: Rick 479.575.8767
 4190 Bell Engineering Center
 Fayetteville, AR 72701
 rick@uark.edu

Ship To

University of Arkansas
 Attn: Rick 479.575.8767
 4190 Bell Engineering Center
 Fayetteville, AR 72701

| P.O. Number | | Terms | Payment Due | Ship | Via | EX-WORKS | Tracking No. | |
|---|---------|---|-------------|-----------|-------------|--------------|-----------------------|----------|
| Rick | | Visa | 6/10/2015 | 6/10/2015 | UPS Gr PPAD | Brockton, MA | 1Z014063 03 5961 3388 | |
| Item | Qty Ord | Description | | | Qty Ship | Unit Price | Prev. Inv. | Amount |
| 01 | 1 | Model 3362: Dual Channel; HP, LP, BP, BR Filter Serial Number: FP1605R Includes one (CD Version) Operating Manual | | | 1 | 2,075.00 | 0 | 2,075.00 |
| | | 5% Educational Discount | | | | -5.00% | | -103.75 |
| | | Shipping | | | | 20.57 | 0 | 20.57 |
| <p><small>"ECCN# EAR99 EXPORT OR REEXPORT OF THESE PRODUCTS IS SUBJECT TO U.S. EXPORT LAWS/REGULATIONS AND THE BUYER/RECIPIENT/EXPORTER IS ADVISED TO CHECK WITH U.S. DEPT OF COMMERCE AND COMPLY WITH APPLICABLE U.S. EXPORT LAWS/REGULATIONS BEFORE EXPORTING OR REEXPORTING THESE PRODUCTS. DIVERSION CONTRARY TO U.S. LAWS IS PROHIBITED"</small></p> <p><small>ALL KROHN-HITE PRODUCTS ARE 100% MANUFACTURED IN THE U.S.A.</small></p> | | | | | | | | |

Title to goods shall not pass and goods shall not be resold until customer has paid in full to this company the amount of this invoice. Interest will be charged at 1.5% per month (18% annual rate) on the balance unpaid after 30 days. Customer is responsible for all costs associated with any collection of these charges. ALL PAYMENTS MUST BE IN U.S.A. DOLLARS

| | |
|--------------|-------------------|
| Total | \$1,991.82 |
|--------------|-------------------|



Newport[®]

Experience | Solutions

Newport Corporation
Corporate Headquarters
1791 Deere Avenue, Irvine,
CA, 92606
USA
Tel (800) 222-6440 Fax (949) 253-1680
Federal I.D. 94-0849175
Duns No. 00-914-5814
www.newport.com

For payments made by check, remit to:
Newport Corporation
27631 Network Place
Chicago, IL 60673-1276

Page 1 of 1
06/04/2015

For payments made by WIRE/ACH:
JPMorgan Chase Bank N.A.
New York, NY
ABA# 021000021
SWIFTCODE# CHASUS33
For Account: 589267363
Beneficiary: Newport Corporation

2657708

Invoice

Bill-To
UNIV OF ARKANSAS FAYETTEVILLE
321 ADMINISTRATION BLDG.
FAYETTEVILLE AR 72701

Ship-To
UNIV OF ARKANSAS
Attn: Richard Coffman
Bell Engineering Center
800 W Dickson Street
Room 4190
FAYETTEVILLE AR 72701

Information
Invoice Number: 4673272
Date: 06/03/2015
Delivery Note No./Date: 30189204/ 06/03/2015
Reference Order no./Date: 2560334/ 05/07/2015
PO No: 831364
PO Date: 05/07/2015
Customer No: 3000419
UNIV OF ARKANSAS FAYETTEVILLE
USD
Terms of Payment: NET 30 DAYS
Terms of Delivery: Prepaid and Add -Domestic Only
FOB ORIGIN

Notes

| Line | Item/Description | Unit Base Price | Unit Net Price | Quantity | Total Amount |
|-------------------------|---|-----------------|----------------|----------|----------------------|
| 200 | TLB-6817-P #6817-P LASER SYS, 835-853NM Mode-Hop Free Tuning Range: >90 GHz Available Wavelengths: 838-853 nm Typical Minimum Power: 15 mW @ 852 nm System includes controller Serial numbers: (VP0070-10185) | 22,000.00 | 22,000.00 | 1 | 22,000.00 |
| Item Total | | | | | USD 22,000.00 |
| Gross Value | | | | | 22,000.00 |
| Net Value | | | | | 22,000.00 |
| Shipping Fees | | | | | 27.74 |
| Total Amount Due | | | | | USD 22,027.74 |

BUSINESS AFFAIRS
RUCD 10 JUN 15 11:16



Newport Corporation
 Corporate Headquarters
 1791 Deere Avenue, Irvine,
 CA, 92606
 USA
 Tel (800) 222-6440 Fax (949) 253-1680
 Federal I.D. 94-0849175
 Duns No. 00-914-5814
 www.newport.com

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 Experience | Solutions

For payments made by check, remit to:
 Newport Corporation
 27631 Network Place
 Chicago, IL 60673-1276

Page 1 of 1
 06/23/2015

For payments made by WIRE/ACH:
 JPMorgan Chase Bank N.A.
 New York, NY
 ABA# 021000021
 SWIFTCODE# CHASUS33
 For Account: 589267363
 Beneficiary: Newport Corporation

2666046

Invoice

Bill-To
 UNIV OF ARKANSAS FAYETTEVILLE
 321 ADMINISTRATION BLDG.
 FAYETTEVILLE AR 72701

Information
Invoice Number: 4677456
Date: 06/22/2015
Delivery Note No./Date: 30201265/ 06/22/2015
Reference Order no./Date: 2560334/ 05/07/2015
PO No: 831364
PO Date: 05/07/2015
Customer No: 3000419
 UNIV OF ARKANSAS FAYETTEVILLE
 USD
Currency:
Terms of Payment: NET 30 DAYS
Terms of Delivery: Prepaid and Add -Domestic Only
 FOB ORIGIN

Ship-To
 UNIV OF ARKANSAS
 Attn: Richard Coffman
 Bell Engineering Center
 800 W Dickson Street
 Room 4190
 FAYETTEVILLE AR 72701

Notes

| Line | Item/Description | Unit Base Price | Unit Net Price | Quantity | Total Amount |
|-------------------------|--|-----------------|----------------|----------|----------------------|
| 100 | 113SI07024 TLB-6800, 823 nm TLB-6800 Center wavelength: 823 nm Free space output power: 10mW best effort Serial numbers: (VP0071-10192) | 17,000.00 | 17,000.00 | 1 | 17,000.00 |
| Item Total | | | | | USD 17,000.00 |
| Gross Value | | | | | 17,000.00 |
| Net Value | | | | | 17,000.00 |
| Shipping Fees | | | | | 62.25 |
| Total Amount Due | | | | | USD 17,062.25 |



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Experience | Solutions

Newport Corporation
Corporate Headquarters
1791 Deere Avenue, Irvine,
CA, 92606
USA
Tel (800) 222-6440 Fax (949) 253-1680
Federal I D. 94-0849175
Duns No. 00-914-5814
www.newport.com

(For payments made by check, remit to:)
Newport Corporation
27631 Network Place
Chicago, IL 60673-1276

Page 1 of 1
06/10/2015

For payments made by WIRE/ACH:
JPMorgan Chase Bank N.A.
New York, NY
ABA# 021000021
SWIFTCODE# CHASUS33
For Account: 389267363
Beneficiary: Newport Corporation

2661063

Invoice

Bill-To
UNIV OF ARKANSAS FAYETTEVILLE
321 ADMINISTRATION BLDG.
FAYETTEVILLE AR 72701

Ship-To
UNIV OF ARKANSAS
Attn: Richard Coffman
Bell Engineering Center
800 W Dickson Street
Room 4190
FAYETTEVILLE AR 72701

Information
Invoice Number: 4674842
Date: 06/09/2015
Delivery Note No./Date: 30192847/ 06/09/2015
Reference Order no./Date: 2560334/ 05/07/2015
PO No: 831364
PO Date: 05/07/2015
Customer No: 3000419
UNIV OF ARKANSAS FAYETTEVILLE
USD
Currency: USD
Terms of Payment: NET 30 DAYS
Terms of Delivery: Prepaid and Add -Domestic Only
FOB ORIGIN

Notes

| Line | Item/Description | Unit Base Price | Unit Net Price | Quantity | Total Amount |
|----------------------|--|-----------------|----------------|----------|---------------------|
| 400 | F-CPL-M12851-FCPC MM FO Coupler, 1X2 10/90, 850nm, 62.5um, FCP | 156.00 | 156.00 | 3 | 468.00 |
| 500 | 160718 #1607FC-AC, VIS BAL RCVR, FIBER-CPLD Serial numbers: (10713-WX) | 2,135.00 | 2,135.00 | 1 | 2,135.00 |
| Item Total | | | | | USD 2,603.00 |
| Gross Value | | | | | 2,603.00 |
| Net Value | | | | | 2,603.00 |
| Shipping Fees | | | | | 11.87 |

4
5

Total Amount Due **USD 2,614.87**

BUSINESS AFFAIRS
RUCD 15 JUN 15 12:03

2641179

Thorlabs, Inc.

56 Sparta Avenue
Newton, NJ 07860-2402

Phone 973-300-3000
Fax 973-300-3600
Email sales@thorlabs.com

THORLABS

Quotation

Bill to

**University of Arkansas
4190 Bell Engineering Center
Fayetteville, AR 72701**

Number: TQ0160608-2
Created date: 4/8/2015
Date: 4/15/2015
Quotation Deadline: 6/7/2015
Purchase order: COFFMAN/QUOTE
Terms of payment: Net 30
Invoice Account: 219328
Sales order:
Sales Contact: Cynthia Wagner
Ship Via: UPS Ground
Terms of Delivery: Ex Works Newton
Your Tax Exempt No.:
Page: 1 of 2

Ship to

**University of Arkansas
Department of Civil Engineering
4190 Bell Engineering Center
Fayetteville, AR 72701**

**Attention: Richard Coffman
Telephone: 479 575-8767
Fax: 479 575-7168**

UA
Line #

| Item Number | Description | Quantity | Price Each | Disc. % | Disc. Price | Amount | Ship date |
|-------------|---|----------|------------|---------|-------------|--------------|-----------|
| 1 | IO-5-850-HP IO-5-850-HP; Narrowband Adjustable Optical Isolator; 850nm | 2.00 | 2,160.00 | 2.00 | 2,116.800 | 4,233.60 USD | 5/8/2015 |
| 2 | SH05 1/2" Beam Shutter | 2.00 | 451.00 | 2.00 | 441.980 | 883.96 USD | 4/8/2015 |
| 3 | BSF05-B 1/2" Beam Sampler, B Coating, UV Fused Silica | 2.00 | 36.30 | 2.00 | 35.575 | 71.15 USD | 4/15/2015 |
| 4 | S144C IS InGaAs Power Head, 800-1700nm, 500mW | 2.00 | 793.00 | 2.00 | 777.140 | 1,554.28 USD | 4/8/2015 |
| 5 | PAFA-X-4-B Achromat FiberPort, FC/PC & FC/APC, f=4.00 mm, 650-1050 nm Achromatic FiberPort, FC/PC & FC/APC, f=4.00 mm, 400 - 700 nm, Waist Dia 0.75 mm | 3.00 | 515.00 | 2.00 | 504.700 | 1,514.10 USD | 4/8/2015 |
| 6 | EO-PM-NR-C1 Broadband Electro-optic phase modulator, 600-900nm | 1.00 | 2,420.00 | 2.00 | 2,371.600 | 2,371.60 USD | 4/15/2015 |
| 7 | TPA850P10 Tapered Amplifier Module 850nm (free space output) | 1.00 | 6,400.00 | | 6,400.000 | 6,400.00 USD | 4/8/2015 |
| 8 | EL-25-2.5X-B 2.5X Beam Expander B-Coating | 1.00 | 1,030.00 | 2.00 | 1,009.400 | 1,009.40 USD | 4/8/2015 |
| 9 | FB820-10 Bandpass Filter, CWL = 820, FWHM = 10 | 1.00 | 84.67 | 2.00 | 82.980 | 82.98 USD | 4/9/2015 |

↓
have not rec'd line 7

Thorlabs, Inc.

56 Sparta Avenue
Newton, NJ 07860-2402

Phone 973-300-3000
Fax 973-300-3600
Email sales@thorlabs.com



Quotation

Bill to

**University of Arkansas
4190 Bell Engineering Center
Fayetteville, AR 72701**

Ship to

**University of Arkansas
Department of Civil Engineering
4190 Bell Engineering Center
Fayetteville, AR 72701**

**Attention: Richard Coffman
Telephone: 479 575-8767
Fax: 479 575-7168**

Number TQ0160608-2
Created date 4/8/2015
Date 4/15/2015
Quotation Deadline 6/7/2015
Purchase order COFFMAN/QUOTE
Terms of payment Net 30
Invoice Account 219328
Sales order
Sales Contact Cynthia Wagner
Ship Via UPS Ground
Terms of Delivery Ex Works Newton
Your Tax Exempt No.
Page 2 of 2

UA
Line #
10

| Item Number | Description | Quantity | Price Each | Disc. % | Disc. Price | Amount | Ship date |
|-------------|---------------------------------------|----------|------------|---------|-------------|-----------|-----------|
| FB850-10 | Bandpass Filter, CWL = 850, FWHM = 10 | 1.00 | 98.57 | 2.00 | 96.600 | 96.60 USD | 4/9/2015 |

Please note that any changes may affect your pricing. Estimated shipping charges & freight charges for the heavyweight items may not appear here but will be added upon receipt of order. Release fees & custom taxes are not included in the shipping fee. Please pay in US funds by check, credit card, or wire to Thorlabs, Inc Acct# 205000754, bank routing#021205376 C/O Lakeland Bank, 615 Rt 206N, Newton, NJ, 07860, EIN: 22-2873153 For international wire use Wellsfargo Bank, 190 River Road, Summit, NJ 07901, Account#2000039124913, SWIFT code WFBUS6S, ABA#121000248. Acceptance of customers purchase order is conditional on Thorlabs' Terms and Conditions (www.thorlabs.com) which shall control and supersede any other terms and conditions.

US Export Administration Regulations and European Export Laws may apply to the sale, destination and end use of these items and any related technical data. Any diversion contrary to US and European export control regulations is strictly prohibited: www.bis.doc.gov. Title passes to the buyer at the point of shipment, Thorlabs facility unless stated otherwise by Thorlabs

Subtotal: 18,217.67
Total Discount: 0.00
Shipping and Handling: 14.21
Sales Tax: 0.00
Grand Total: 18,231.88 USD

Thorlabs, Inc.

56 Sparta Avenue
Newton, NJ 07860-2402

Phone : 973-300-3000
Fax : 973-300-3600
E-mail : sales@thorlabs.com



Invoice 2061095

Bill to

University of Arkansas
Accounts Payable
321 Administration Building
Fayetteville, AR 72701

Ship to

University of Arkansas
Bell Engineering Center Rm 4190
800 W Dickson Street

Fayetteville, AR 72701

Attention: Richard Coffman
Telephone: 479 575-8767
Fax: 479 575-7168

Inv. Date: 4/17/2015
Due: 5/17/2015
Purchase Order: 829540
Terms of payment: Net 30
Sales Order: TS1354612
Sales Contact: Jennifer Geerhart
Delivery Method: UPS Ground
Terms of Delivery: Ex Works Newton
Delivery Date: 4/17/2015
Page: 1 of 3

Contact: Richard Coffman
Customer Account: 219328
Invoice Account: 219328
Your Tax Exempt No.:

E-mail:
Fax: 14795754158

| Item Number | Description | Qty Sold | Std Price | Disc. % | Disc. Price | Ext Price |
|---|--|----------|-----------|---------|-------------|--------------|
| IO-5-850-HR | IO-5-850-HP; Narrowband Adjustable Optical Isolator; 850nm | 2 | 2,160.00 | 2.00 | 2,116.800 | 4,233.60 USD |
| Commodity code: 9013800000 Country/region of origin US Quantity : 2.00 Packing slip No.: PS01991463 Ship date: 4/17/2015 | | | | | | |
| SH05 | 1/2" Beam Shutter | 2 | 451.00 | 2.00 | 441.980 | 883.96 USD |
| Commodity code: 9013900000 Country/region of origin US Quantity : 2.00 Packing slip No.: PS01991463 Ship date: 4/17/2015 | | | | | | |
| BSF05-B | 1/2" Beam Sampler, B Coating, UV Fused Silica | 2 | 36.30 | 2.00 | 35.575 | 71.15 USD |
| Commodity code: 9001901000 Country/region of origin US Quantity : 2.00 Packing slip No.: PS01991463 Ship date: 4/17/2015 | | | | | | |
| S144C | IS InGaAs Power Head, 800-1700nm, 500mW | 2 | 793.00 | 2.00 | 777.140 | 1,554.28 USD |
| Commodity code: 9031498000 Country/region of origin DE Quantity : 2.00 Packing slip No.: PS01991463 Ship date: 4/17/2015 S/N: 15022737 Qty : -1.00 S/N: 15030233 Qty : -1.00 | | | | | | |

RUC0244PR15-0301

1
2
3
4

Thorlabs, Inc.

56 Sparta Avenue
Newton, NJ 07860-2402

Phone : 973-300-3000
Fax : 973-300-3600
E-mail : sales@thorlabs.com



Invoice 2061095

Bill to

University of Arkansas
Accounts Payable
321 Administration Building
Fayetteville, AR 72701

Ship to

University of Arkansas
Bell Engineering Center Rm 4190
800 W Dickson Street
Fayetteville, AR 72701

Attention: Richard Coffman
Telephone: 479 575-8767
Fax: 479 575-7168

Inv. Date: 4/17/2015
Due: 5/17/2015
Purchase Order: 829540
Terms of payment: Net 30
Sales Order: TS1354612
Sales Contact: Jennifer Geerhart
Delivery Method: UPS Ground
Terms of Delivery: Ex Works Newton
Delivery Date: 4/17/2015
Page: 2 of 3

Contact: Richard Coffman
Customer Account: 219328
Invoice Account: 219328
Your Tax Exempt No. ...:

E-mail:
Fax: 14795754158

| Item Number | Description | Qty Sold | Std Price | Disc. % | Disc. Price | Ext Price | |
|-------------|--|----------|-----------|---------|-------------|-------------|----|
| PAFA-X-4-B | Achromat FiberPort, FC/PC & FC/APC, f=4.00 mm, 650-1050 nm Achromatic FiberPort, FC/PC & FC/APC, f=4.00 mm, 400-700 nm, Waist Dia. 0.75 mm Commodity code: 9013800000 Country/region of origin US Quantity : 3.00 Packing slip No.: PS01991463 Ship date: 4/17/2015 | 3 | 515.00 | 2.00 | 504.700 | 1,514.10USD | 5 |
| EO-PM-NR-C1 | Broadband Electro-optic phase modulator, 600-900nm Commodity code: 9013800000 Country/region of origin US Quantity : 1.00 Packing slip No.: PS01991463 Ship date: 4/17/2015 S/N: PN1503710 Qty : -1.00 | 1 | 2,420.00 | 2.00 | 2,371.600 | 2,371.60USD | te |
| FB820-10 | Bandpass Filter, CWL = 820, FWHM = 10 Commodity code: 9002208000 Country/region of origin US Quantity : 1.00 Packing slip No.: PS01991463 Ship date: 4/17/2015 | 1 | 84.67 | 2.00 | 82.980 | 82.98USD | 9 |
| FB850-10 | Bandpass Filter, CWL = 850, | 1 | 98.57 | 2.00 | 96.600 | 96.60USD | 10 |

Thorlabs, Inc.
 56 Sparta Avenue
 Newton, NJ 07860-2402

Phone: 973-300-3000
 Fax : 973-300-3600
 E-mail : sales@thorlabs.com



2641179

Invoice 2061095

Bill to

University of Arkansas
 Accounts Payable
 321 Administration Building
 Fayetteville, AR 72701

Inv. Date: 4/17/2015
 Due: 5/17/2015
 Purchase Order: 829540
 Terms of payment: Net 30
 Sales Order: TS1354612
 Sales Contact: Jennifer Geerhart
 Delivery Method: UPS Ground
 Terms of Delivery: Ex Works Newton
 Delivery Date: 4/17/2015
 Page: 3 of 3

Ship to

University of Arkansas
 Bell Engineering Center Rm 4190
 800 W Dickson Street
 Fayetteville, AR 72701

Contact: Richard Coffman
 Customer Account: 219328
 Invoice Account: 219328
 Your Tax Exempt No. ...:

Attention: Richard Coffman
 Telephone: 479 575-8767
 Fax: 479 575-7168

E-mail:
 Fax: 14795754158

| Item Number | Description | Qty Sold | Std Price | Disc. % | Disc. Price | Ext Price |
|---|-------------|----------|-----------|---------|-------------|-----------|
| | FWHM = 10 | | | | | |
| Commodity code: 9002208000 Country/region of origin US | | | | | | |
| Quantity : 1.00 Packing slip No.: PS01991463 Ship date: 4/17/2015 | | | | | | |

RUCD 249PR15WS01

BUSINESS AFFAIRS

Please pay in US funds by check to the above address, credit card, or wire to Thorlabs, Inc Acct#205000754, bank routing # 021205376 C/O Lakeland Bank, 815 Rt.208N, Newton, NJ, 07860 EIN: 22-2673153. DUNS 19-385-3726. For international wires only use Wells Fargo Bank, 190 River Road, Summit, NJ 07901, Account#2000039124913, SWIFT code WFBUS68, ABA#121000248. Thorlabs' Terms and Conditions (www.thorlabs.com) control and supersede any other terms and conditions. Export Administration Regulations and European Export Laws may apply to the sale, destination and end use of these items and any related technical data. Any diversion contrary to US and European export control regulations is strictly prohibited: www.bis.doc.gov
 Title passes to the buyer at the point of shipment, Thorlabs facility unless stated otherwise by Thorlabs

Subtotal: 10,808.27
 Total Discount: 0.00
 Shipping and Handling: 13.14
 Sales Tax: 0.00
 Invoice Total: 10,821.41 USD

CVLG



Thorlabs, Inc.

56 Sparta Avenue
Newton, NJ 07860-2402

Phone : 973-300-3000
Fax : 973-300-3600
E-mail : sales@thorlabs.com

THORLABS

2641569

Invoice 2064859

Bill to

University of Arkansas
Accounts Payable
321 Administration Building
Fayetteville, AR 72701

Inv. Date: 4/24/2015
Due: 5/24/2015
Purchase Order: 829540
Terms of payment: Net 30
Sales Order: TS1354612
Sales Contact: Jennifer Geerhart
Delivery Method: UPS Ground
Terms of Delivery: Ex Works Newton
Delivery Date: 4/23/2015
Page: 1 of 1

Ship to

University of Arkansas
Bell Engineering Center Rm 4190
800 W Dickson Street

Fayetteville, AR 72701

Contact: Richard Coffman
Customer Account: 219328
Invoice Account: 219328
Your Tax Exempt No. ...:

Attention: Richard Coffman
Telephone: 479 575-8767
Fax: 479 575-7168

creg

E-mail:
Fax: 14795754158

8. *no chase*

| Item Number | Description | Qty Sold | Std Price | Disc. % | Disc. Price | Ext Price |
|---|--|----------|-----------|---------|-------------|------------|
| F280APC-B | Fiber Collimation Package, λ=633nm, f = 18.24 mm, FC/APC | 1 | 195.00 | | 195.000 | 195.00 USD |
| Commodity code: 9013800000 Country/region of origin US Quantity : 1.00 Packing slip No.: PS01995646 Ship date: 4/23/2015 | | | | | | |
| BE052-B | Variable Beam Expander 0,5- 2X | 1 | 814.00 | | 814.000 | 814.00 USD |
| Commodity code: 9013800000 Country/region of origin SE Quantity : 1.00 Packing slip No.: PS01995646 Ship date: 4/23/2015 | | | | | | |

~~8~~

creg

need lines

exchanged item

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Tit

re to Thorlabs, Inc Acct#205000754,
J. 07860 EIN: 22-2873153 DUNS 19-
Road, Summit, NJ 07901.
Thorlabs' Terms and Conditions
is Export Administration Regulations
se of these items and any related
regulations is strictly prohibited.

stated otherwise by Thorlabs

| | |
|------------------------|--------------|
| Subtotal: | 1,009.00 |
| Total Discount: | 0.00 |
| Shipping and Handling: | 0.00 |
| Sales Tax: | 0.00 |
| Invoice Total: | 1,009.00 USD |

Thorlabs, Inc.

56 Sparta Avenue
Newton, NJ 07860-2402

Phone : 973-300-3000
Fax : 973-300-3600
E-mail : sales@thorlabs.com

THORLABS

2645322

Invoice 2065500

Bill to

University of Arkansas
Accounts Payable
321 Administration Building
Fayetteville, AR 72701

weg

Inv. Date: 4/24/2015
Due: 5/24/2015
Purchase Order: 829540
Terms of payment: Net 30
Sales Order: TS1354612
Sales Contact: Jennifer Geerhart
Delivery Method: FedEx Priority - Next Day
Terms of Delivery: No charge
Delivery Date: 4/24/2015
Page: 1 of 1

Ship to

University of Arkansas
Bell Engineering Center Rm 4190
800 W Dickson Street

Fayetteville, AR 72701

Attention: Richard Coffman
Telephone: 479 575-8767
Fax: 479 575-7168

Contact: Richard Coffman
Customer Account: 219328
Invoice Account: 219328
Your Tax Exempt No. ...:

E-mail:
Fax: 14795754158

#8

| Item Number | Description | Qty Sold | Std Price | Disc. % | Disc. Price | Ext Price |
|----------------|---|----------|-----------|---------|-------------|------------|
| F280APC-CUSTOM | F280APC, FC/APC Collimation Package, custom aligned to 835nm. | 1 | 295.00 | | 295.000 | 295.00 USD |

Lead Time: 1 weeks if
components are in stock.

Commodity code: 9013800000 Country/region of origin US
Quantity : 1.00 Packing slip No.: PS01996353 Ship date: 4/24/2015

weg
Need line

exchanged item

BUSINESS AFFAIRS
PROC. IMP. SERVICE

Please pay i
bank routing
395-3726 F
Account#20
(www.thorlabs.com)
and Europe
technical dr
www.bis.dc
Title passe

Thorlabs, Inc Acct#205000754,
BIN 22-2873153. DUNS 10-
nmil, NJ 07901,
Terms and Conditions
Administration Regulations
ie items and any related
ins is strictly prohibited

| | |
|------------------------|------------|
| Subtotal: | 295.00 |
| Total Discount: | 0.00 |
| Shipping and Handling: | 0.00 |
| Sales Tax: | 0.00 |
| Invoice Total: | 295.00 USD |

otherwise by Thorlabs

all rec'd except #7

5/25/2015

Thorlabs, Inc.

56 Sparta Avenue
Newton, NJ 07860-2402

Phone : 973-300-3000
Fax : 973-300-3600
E-mail : sales@thorlabs.com



2661034

Invoice 2091281

Bill to

**University of Arkansas
Accounts Payable
321 Administration Building
Fayetteville, AR 72701**

Inv. Date: 6/8/2015
Due: 7/8/2015
Purchase Order: 829540
Terms of payment: Net 30
Sales Order: TS1354612
Sales Contact: Jennifer Geerhart
Delivery Method: FedEx Priority - Next Day
Terms of Delivery: No charge
Delivery Date: 6/8/2015
Page: 1 of 1

Ship to

**University of Arkansas
Bell Engineering Center Rm 4190
800 W Dickson Street**

Fayetteville, AR 72701

**Attention: Richard Coffman
Telephone: 479 575-8767
Fax: 479 575-7168**

Contact: Richard Coffman
Customer Account: 219328
Invoice Account: 219328
Your Tax Exempt No. ...:

E-mail:
Fax: 14795754158

| Item Number | Description | Qty Sold | Std Price | Disc. % | Disc. Price | Ext Price |
|-------------|---|----------|-----------|---------|-------------|--------------|
| TPA850P10 | Tapered Amplifier Module 850nm (free space output) | 1 | 6,400.00 | | 6,400.000 | 6,400.00 USD |

Commodity code: 8541402000 Country/region of origin US
Quantity : 1.00 Packing slip No.: PS02023656 Ship date: 8/8/2015
S/N: D1768-5.030307 Qty : -1.00



RUCD 16 JUN 15 08:21

BUSINESS AFFAIRS

Please pay in US funds by check to the above address, credit card, or wire to Thorlabs, Inc Acct#20500754, bank routing # 021205375 C/O Lakeland Bank, 815 Rt.206N, Newton, NJ, 07860 EIN: 22-2873153. DUNS 19-395-3726. For international wires only use Wells Fargo Bank, 190 River Road, Summit, NJ 07901, Account#2000039124913, SWIFT code WFBUS33, ABA#121000248. Thorlabs' Terms and Conditions (www.thorlabs.com) control and supersede any other terms and conditions. Export Administration Regulations and European Export Laws may apply to the sale, destination and end use of these items and any related technical data. Any diversion contrary to US and European export control regulations is strictly prohibited. www.bis.doc.gov
Title passes to the buyer at the point of shipment, Thorlabs facility unless stated otherwise by Thorlabs

Subtotal: 6,400.00
Total Discount: 0.00
Shipping and Handling: 0.11
Sales Tax: 0.00
Invoice Total: 6,400.11 USD

 **BANK OF ARKANSAS**

INTERNATIONAL BANKING CENTER
ONE WILLIAMS CENTER, 15th FLOOR
TULSA, OK 74172
USA

0364141

INTERNATIONAL WIRE TRANSFER DEBIT

UNIVERSITY OF ARKANSAS
122 ADMINISTRATION BLDG
FAYETTEVILLE, AR 72701
ATTN : LINDA SPRINGSTON

Beneficiary:

GAMMA REMOTE SENSING AG
CREDIT SUISSE AG
ZURICH, SWITZERLAND
CH0504835059525901001

THE FOLLOWING REPRESENTS YOUR DEBITS UNDER OUR REFERENCE NO.: 84363

WE HAVE DEBITED YOUR ACCOUNT NO.: XXXXXXXXXX
WIRE TRANSFER AMOUNT: CHF 22,000.00
EXCHANGE RATE: 1.023800
DEBIT DATE: 4/10/2015

THE FOLLOWING CHARGE(S) WERE INCORPORATED INTO THE TOTAL DEBIT AMOUNT:

| DESCRIPTION | AMOUNT |
|----------------------------|----------------------|
| INTL FX WIRE PAYMENT | USD 22,523.60 |
| TOTAL DEBIT AMOUNT: | USD 22,523.60 |

COMMENTS:

UNIVERSITY OF ARKANSAS BELL 4190
ATTN RICHARD COFFMAN UARK COFFMAN
OFF20141014 GAMMA/UARK COFFMAN
INV141017 FIRST INV FOR GPRI H-POL

FOR INQUIRIES REGARDING THIS TRANSACTION PLEASE CALL (918) 588-6450 OR 1-800-285-6829 (OPTION 4)

THIS ADVICE WAS GENERATED ELECTRONICALLY AND NO SIGNATURE IS REQUIRED.



UNIVERSITY OF
ARKANSAS

The University of Arkansas is not exempt from sales /use tax except for those items specifically exempted by State law.

The laws of the State of Arkansas shall govern this Purchase Order.

| Purchase Order | | |
|---------------------|-------------------|--------------|
| Purchase Order Date | PO/Reference No. | Revision No. |
| Oct 16, 2014 | 815328 | 0 |
| Contact Information | | |
| Contact | Sandra Hancock | |
| Email | shancock@uark.edu | |
| Phone | +1 (479) 575-6021 | |

BU: CVEG

2634141

Order acceptance instructions:

Complete list of terms can be seen at:

<http://procurement.uark.edu/terms.pdf> Mark all packages and freight documents with purchase order number. Invoice must show purchase order number. The University of Arkansas is not exempt from sales/use tax except for those items specifically exempted by State law. Any change(s) to purchase order must be approved by Procurement prior to shipment. If Federal Funding, including Federal Transit Administration (FTA) funds are used in any procurement by the University of Arkansas, certain contract clauses in UA terms and conditions now apply based on the nature and dollar value of the procurement.

| Supplier Information | | Delivery Information | |
|------------------------|---|--|-----------------------|
| Supplier Name | Gamma Remote Sensing AG | Delivery Address | |
| Address | Worbstrasse 225 Gumligen, CH-3073 CH | University of Arkansas | |
| F.O.B./Freight | Destination | Attn: | Richard Coffman |
| Supplier Payment Terms | 0, Net 30 | Room: | 4190 |
| | | Bell Engineering Center 800 W DICKSON STREET Fayetteville, AR 72701 United States | |
| | | Shipping Information | |
| | | Delivery Date | Oct 17, 2014 |
| | | Expedite | No |
| | | Shlp Via | Best Carrier-Best Way |

Notes to Supplier

| Line No. | Product Description | Catalog No. | Size / Packaging | Unit Price | Quantity | Ext. Price |
|----------|--|-------------|------------------|-----------------------------|----------|-----------------------------|
| 1 of 2 | Upgrade to a Ku-Band multi-polarization system | | 1/EA | 89,270.70 USD | 1 EA | 89,270.70 USD |
| | ADDITIONAL INFO | | | | | |
| | Unit Price | 89,270.70 | | | | |
| | Taxable | Yes | | | | |
| | Capital Expense | No | | | | |
| | Commodity Code | 41100000 | | | | |

4/8/2015

Fax


Laboratory and scientific equipment

| | | | | | |
|------------------------|--|-----------|-----------------------------|------|-----------------------------|
| 2 of 2 | Upgrade the scanner motor, connector plate and instrument computer | 1/EA | 26,256.10 USD | 1 EA | 26,256.10 USD |
| ADDITIONAL INFO | | | | | |
| Unit Price | | 26,256.10 | | | |
| Taxable | Yes | | | | |
| Capital Expense | No | | | | |
| Commodity Code | 41100000 Laboratory and scientific equipment | | | | |

| | | | |
|---|--|----------|-----------------------|
| Invoices must be submitted to the Billing Address indicated below to assure timely payment. | | Subtotal | 115,520.00 |
| | | Tax1 | 11,263.66 |
| | | Shipping | 0.00 |
| | | Handling | 0.00 |
| | | Total | 126,783.66 USD |

| Billing Information | Billing Address |
|---|--|
| To avoid payment delays, invoice must include the PO referenced above | University of Arkansas University of Arkansas Accounts Payable 321 Administration Bldg Fayetteville, AR 72701 United States |
| Contract <i>no value</i> | |
| Quote number | |

Wire 22,000 CHF
Jones
418116

JE wire fee 0402-12501-21-0000
Category Equipmnt
acct# 

Wire Transfer Details Form

In order to process a wire transfer for procurement, the Payment With Order form must be used to create a requisition in RazorBuy.

Please note: A wire fee will be required (\$15 domestic/\$35 international). This fee will be expensed against the departmental cost center by journal entry; the fee amount should not be added to the requisition or PO. In the event that foreign currency is requested, the transfer is subject to the bank's current exchange rate.

Important: The supplier's name and address on the requisition/PO **must match the account holder's name and address**. Sometimes these names are the same, sometimes they are different. (As an example, Supplier Name: Fincas Olson Del Norte S.A., Account Holder Name: A&J Seed Farms S.A.)

Please provide the following information and attach this form to the RazorBuy requisition:

Requisition Number _____

Name of Bank Receiving Transfer:

_____ Credit Suisse _____

Bank's Address:

_____ Firmenkunden, CH-3000 Bern, Switzerland _____

Name of **Account Holder** for deposit of funds:

_____ Gamma Remote Sensing AG _____

Account Holder's Address: _____ Worbstrasse 225, Gumligen, CH-3073 CH _____

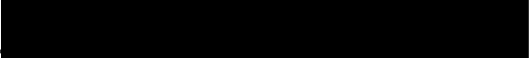
Routing Information: (ABA/Routing number, Swift Code, IBAN number etc.):

Note: For international wire transfers a Swift Code **MUST** be provided.

_____ SWIFT NUMBER: CRESCHZZ80A

IBAN ACCOUNT NUMBER: CH05 0483 50595259-0100-1

Account Number for deposit of funds:

_____  _____

Amount and Type of Currency (ex. US Dollars, Euro, etc.): _____ CHF 22,000 _____

Information to be listed in memo field (reference#, invoice# etc.): _____

Quote number UARK_Coffman_off20141014

Invoice GAMMA/UARK_Coffman_inv141017 first invoice for GPRI H-Pol. upgrade

GAMMA Remote Sensing AG, CH-3073 Gümliigen

University of Arkansas
Accounts Payable
321 Administration Bldg.
Fayetteville, AR 72701
USA

Invoice GAMMA/UARK_Coffman_inv141017 first invoice for GPRI H-Pol. upgrade

Reference: PO 815328 of 16-Oct-2014

Quote number UARK_Coffman_of120141014

Gümliigen, 17. Oct. 2014

Dear Sirs,

In accordance with your PO 815328 of 16-Oct-2014 we send you this invoice for the first payment over 20% of the cost forseen upon the receipt of the order:

| Item | Price |
|--|---------------------|
| 1. First payment over 20% of the cost (110'000 CHF) forseen upon the receipt of the order. | CHF 22'000.- |
| Total | CHF 22'000.- |

The price does not include US taxes or customs.

Payment conditions: Payable within 30 days to our bank account:

Credit Suisse, Firmenkunden, CH-3000 Bern, Switzerland

Swift Number [REDACTED]

IBAN Account No. [REDACTED]

In favor of Gamma Remote Sensing Research and Consulting AG

With kind regards,

U. Wegmüller



CREDIT SUISSE



Home Switzerland > Private Clients > Individual Accounts

IBAN

Make your payments more quickly and cost-effectively with IBAN.

IBAN (International Bank Account Number) is an international standard for displaying your account number. IBAN allows account numbers to be validated more simply, quickly, and reliably all over the world. Credit Suisse recommends active use of IBAN in international and national payment transactions.

What Benefits Does IBAN Offer You?

a) Higher quality

- More cost-efficient
- Faster credit
- Input errors recognized immediately thanks to check digit
- Lower risk of rejection or delay

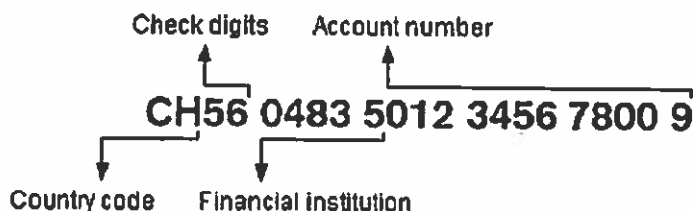
b) Quicker processing

- Fewer manual interventions thanks to high level of automation
- Less filtering
- Faster throughput times
- Integrated bank clearing number: only one number required for national payment transactions

Where Can You Find Your IBAN Number?

- On your itemized statements and account statements
- In Direct Net - under the Account/Account Details menu item
- In general, on your payment transaction documents

Structure of an IBAN Account Number



Payments in Europe

The IBAN must be quoted for payments within Europe. In addition, a Bank Identifier Code (BIC) is required. The BIC is a unique identifier of the relevant bank.

Payment orders to EU or EEA countries without any indication of IBAN or BIC may be subjected to a charge or rejected by the recipient banks. Since January 1, 2007 Credit Suisse has levied an additional charge for payment orders in EUR without IBAN/ BIC in order to cover all processing and return costs.

Further details on IBAN are available at:

- [Fact sheet PDF \(98 KB\)](#)
- [IBAN country list \(SIX Interbank Clearing\)](#)

Advice and Contact

Telephone 0848 880 844

- [Contact & Support](#)
- [Account Opening](#)
- [Find a branch](#)

Login

- [Online Banking](#)

Open now

- [Bonviva Banking Packages](#)
- [Viva Banking Packages](#)
- [Open an account today](#)

Useful Links

Payment Transaction Prices and Conditions

- [Download PDF \(355 KB\)](#)

Payment Acceptance Deadlines

- [Download PDF \(600 KB\)](#)

Cross-Border Payment Transactions

- [Download PDF \(200 KB\) \(Ger\)](#)

SEPA

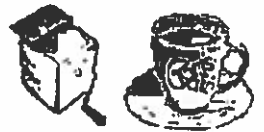
- [Single Euro Payments Area](#)

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[Terms of Use](#), [Internet Security](#), [Privacy & Cookie Policy](#) and [Global Patriot Act Certificate](#).



IBAN - International Bank Account Number



On this web site you can create and check *International Bank Account Numbers* (IBAN). The calculations are performed on the local machine with JavaScript. None of your personal data are sent through the web.

Information about IBAN are from ECBS (European Committee for Banking Standards) and the IBAN Registry at SWIFT. IBAN is an ISO standard (ISO 13616: 1997).

iban.html & iban.js 1.5 © 2002-2010, Thomas Günther

This GPL program comes with ABSOLUTELY NO WARRANTY; this is free software, and you are welcome to redistribute it under certain conditions; see the copyright for details.

Create or check International Bank Account Numbers

| | | |
|---|-------------------------------------|---|
| Country Switzerland (CH) | Bank/Branch Code [REDACTED] | Account Number [REDACTED] |
| Create IBAN ↓ | <input checked="" type="checkbox"/> | <input type="checkbox"/> Check IBAN |
| International Bank Account Number (IBAN) IBAN CH05 0483 5059 5259 0100 1 | | |

Attention!

Bank/Branch Codes and Account Numbers are NOT checked for validity und existence!
Only competent bank institutes can officially generate or validate an IBAN!

The IBAN is composed of the *Country Code* (ISO 3166), a 2-digit *checksum* and the *Basic Bank Account Number* (BBAN, ISO 13616).

The BBAN consists of a *Bank/Branch Code* and the *Account Number*, both with optional check digits. The exact structure is country specific. See the format table below for details.

To create an IBAN you must first choose the country from the selection bar and type the Bank/Branch

BANK OF ARKANSAS

INTERNATIONAL BANKING CENTER
ONE WILLIAMS CENTER, 15th FLOOR
TULSA, OK 74172
USA

2655848

INTERNATIONAL WIRE TRANSFER DEBIT

UNIVERSITY OF ARKANSAS
122 ADMINISTRATION BLDG
FAYETTEVILLE, AR 72701
ATTN : LINDA SPRINGSTON

Beneficiary:

GAMMA REMOTE SENSING AG
CREDIT SUISSE AG
ZURICH, SWITZERLAND

THE FOLLOWING REPRESENTS YOUR DEBITS UNDER OUR REFERENCE NO.: 88424

WE HAVE DEBITED YOUR ACCOUNT NO.:

WIRE TRANSFER AMOUNT: CHF 88,000.00
EXCHANGE RATE: 1.060400
DEBIT DATE: 6/5/2015

THE FOLLOWING CHARGE(S) WERE INCORPORATED INTO THE TOTAL DEBIT AMOUNT:

| DESCRIPTION | AMOUNT |
|----------------------------|----------------------|
| INTL FX WIRE PAYMENT | USD 93,315.20 |
| TOTAL DEBIT AMOUNT: | USD 93,315.20 |

COMMENTS:

UNIVERSITY OF ARKANSAS ATTN
RICHARD COFFMAN QUOTE NUMBER
UARK-COFFMAN-OFF20141014
INVOICE INV-150303 SECOND INVOICE

FOR INQUIRIES REGARDING THIS TRANSACTION PLEASE CALL (918) 588-6450 OR 1-800-285-6829 (OPTION 4)

THIS ADVICE WAS GENERATED ELECTRONICALLY AND NO SIGNATURE IS REQUIRED.

6/4/2015

Fax



The University of Arkansas is not exempt from sales /use tax except for those items specifically exempted by State law.

| Purchase Order | | |
|---------------------|-------------------|--------------|
| Purchase Order Date | PO/Reference No. | Revision No. |
| Oct 16, 2014 | 815328 | 0 |
| Contact Information | | |
| Contact | Sandra Hancock | |
| Email | shancock@uark.edu | |
| Phone | +1 (479) 575-6021 | |

The laws of the State of Arkansas shall govern this Purchase Order.

2655848

BU-CREG

Order acceptance Instructions:

Complete list of terms can be seen at: <http://procurement.uark.edu/terms.pdf> Mark all packages and freight documents with purchase order number. Invoice must show purchase order number. The University of Arkansas is not exempt from sales/use tax except for those items specifically exempted by State law. Any change(s) to purchase order must be approved by Procurement prior to shipment. If Federal Funding, including Federal Transit Administration (FTA) funds are used in any procurement by the University of Arkansas, certain contract clauses in UA terms and conditions now apply based on the nature and dollar value of the procurement.

| Supplier Information | | Delivery Information | |
|------------------------|---|-------------------------|------------------------|
| Supplier Name | Gamma Remote Sensing AG | Delivery Address | University of Arkansas |
| Address | Worbstrasse 225 Gumligen, CH-3073 CH | Attn: | Richard Coffman |
| F.O.B./Freight | Destination | Room: | 4190 |
| Supplier Payment Terms | 0, Net 30 | Bell Engineering Center | 800 W DICKSON STREET |
| | | Fayetteville, AR 72701 | United States |
| | | Shipping Information | |
| | | Delivery Date | Oct 17, 2014 |
| | | Expedite | No |
| | | Ship Via | Best Carrier-Best Way |

Notes to Supplier

| Line No. | Product Description | Catalog No. | Size / Packaging | Unit Price | Quantity | Ext. Price |
|------------------------|--|-------------|------------------|------------------|----------|------------------|
| 1 of 2 | Upgrade to a Ku-Band multi-polarization system | | 1/EA | 89,270.70 USD | 1 EA | 89,270.70 USD |
| ADDITIONAL INFO | | | | | | |
| | Unit Price | 89,270.70 | | | | |
| | Taxable | Yes | | | | |
| | Capital Expense | No | | | | |
| | Commodity Code | 41100000 | | | | |

6/4/2015

Fax

Laboratory and scientific equipment

| | | | | | | |
|------------------------|--|-----------|------|-----------------------------|------|-----------------------------|
| 2 of 2 | Upgrade the scanner motor, connector plate and instrument computer | | 1/EA | 26,256.10 USD | 1 EA | 26,256.10 USD |
| ADDITIONAL INFO | | | | | | |
| Unit Price | | 26,256.10 | | | | |
| Taxable | Yes | | | | | |
| Capital Expense | No | | | | | |
| Commodity Code | 41100000 Laboratory and scientific equipment | | | | | |

| | | | |
|---|--|----------|---------------------------|
| Invoices must be submitted to the Billing Address indicated below to assure timely payment. | | Subtotal | 125,816.80 |
| | | Tax1 | 11,263.86 |
| | | Shipping | 0.00 |
| | | Handling | 0.00 |
| | | Total | 120,798.66 USD |

| Billing Information | Billing Address |
|---|--|
| To avoid payment delays, invoice must include the PO referenced above | University of Arkansas University of Arkansas Accounts Payable 321 Administration Bldg Fayetteville, AR 72701 United States |
| Contract <i>no value</i> | |
| Quote number | |

Wine 88,000 CHF
 10 Games
 6/4/15

JE wine fee
 ccn: 0402-12501-21-0000
 category: Equipment
 acct# 80574300

Wire Transfer Details Form

In order to process a wire transfer for procurement, the Payment With Order form must be used to create a requisition in RazorBuy.

Please note: A wire fee will be required (\$15 domestic/\$35 international). This fee will be expensed against the departmental cost center by journal entry; the fee amount should not be added to the requisition or PO. In the event that foreign currency is requested, the transfer is subject to the bank's current exchange rate.

Important: The supplier's name and address on the requisition/PO must match the account holder's name and address. Sometimes these names are the same, sometimes they are different. (As an example, Supplier Name: Fincas Olson Del Norte S.A., Account Holder Name: A&J Seed Farms S.A.)

Please provide the following information and attach this form to the RazorBuy requisition:

Requisition Number _____

Name of Bank Receiving Transfer:

_____ Credit Suisse _____

Bank's Address:

_____ Firmenkunden, CH-3000 Bern, Switzerland _____

Name of Account Holder for deposit of funds:

_____ Gamma Remote Sensing AG _____

Account Holder's Address: _____ Worbstrasse 225, Gumligen, CH-3073 CH _____

Routing Information: (ABA/Routing number, Swift Code, IBAN number etc.):

Note: For international wire transfers a Swift Code MUST be provided.

_____ SWIFT NUMBER: CRESCHZZ80A

IBAN ACCOUNT NUMBER: CH05 0483 50595259-0100-1

Account Number for deposit of funds:

_____  _____

Amount and Type of Currency (ex. US Dollars, Euro, etc.): _____ CHF 88,000 _____

Information to be listed in memo field (reference#, invoice# etc.): _____

Quote number UARK_Coffman_off20141014

Invoice GAMMA/UARK_Coffman_inv150303 second invoice for GPRI H-Pol. upgrade