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**OEA State of Vermont Phase 2 – Additive Manufacturing**

Grant Start Date: 07/01/2018

Grant End Date: 06/30/2019

**Amendment Type: No Cost Extension, Budget Reallocation**

**Amendment Justification**

**No Cost Extension** –

We are requesting an extension of time due to the delayed start of a Project Manager. The original issued RFP did not bring forth a candidate, so the RFP was issued for a second time, resulting in the drafting of a contract. The anticipated start date for the Project Manager will be May 15, 2019. The subgrantee, Vermont Technical College (VTC), has been following individualized work plans for the Principal Investigator and faculty members involved. Each individual is pursuing their individual scope as their teaching schedule allows, so progress thus far, has been incremental. The extension of time will allow the VTC faculty time during the summer months while the main student body is off for the summer to focus on their tasks.

With approval of this proposed extension, we understand the revised grant expiration date would be 12/31/2020.

**Amendment Type: Budget Reallocation**

**Amendment Justification**

We are not requesting any change of the amounts, merely a reallocation of the budget previously approved to reallocate salaries and fringe benefits to add Paul Williams, Grant Management Specialist to support his time allocated to the grant. Salaries and fringe benefits have been reallocated to reflect the changes.

**Reallocation of funds from Travel $5,500.00 to (Salary $3,630.00 / $1,870.00) Fringe for addition of Paul Williams to Grant**

During the period September 30, 2018 to December 30, 2018, the following activities were completed in pursuit of completing the tasks on our grant:  
August 10, 2018 – Meeting with Vermont Technical College (VTC) and private sector employers. Grant Kick-Off Meeting  
a) Meeting Objective: Create a partnership of businesses and educators to foster the development of additive manufacturing in Vermont.  
b) Partnership Overview: Create an organization comprised of Vermont businesses and Vermont Technical College that will purchase a metals-based deposition printer, which will be located at VTC and available for student education during class hours and available to participating businesses during non-class hours for research and development and prototyping.  
  
c) Approach and Timeline  
  
September 19, 2018 - Meeting with VTC and Partners -Guest speaker, Ron Brown from EWI, Buffalo, NY. EWI operates the Additive Manufacturing Consortium (AMC), which provides thought leadership and conducts collaborative sponsored projects to solve common challenges in metal AM. The AMC has four carefully defined goals:   
• Foster technical interchange by presenting timely case studies and research at quarterly meetings.  
• Execute group-sponsored, pre-competitive research projects within the AMC.  
• Collaborate on government funding opportunities.  
• Provide a forum for discussing industrial and government road maps that define future funding.  
  
October 9, 2018 – Meeting with VTC and Private Sector employers   
• Partnership Background/Summary of grant  
• RFP Discussion/Approval  
• Curriculum Development Discussion  
• Steering Committee setup  
• Next Steps  
November 10, 2018 RFP Posted for Project Manager  
November 15, 2018 Questions Due for Project Manager RFP  
November 21, 2018 Proposal Due Date for Project Manager  
One response was received for Project Manager.  
December 6, 2018 – Skype/Conference call with VTC and Steering Committee to review RFP   
In response to the bid received, the committee decided to redraft the Statement of Work required and put the RFP out for bid again, with the hope of a broader response.  
As of the end of the reporting period, the Steering Committee had decided to re-post the RFP. The anticipated timing for this reposting is as follows:  
January 2, 2019 – RFP reposted to bid site for Project Manager  
January 10, 2019 Questions Due for Project Manager  
January 17, 2019 – Proposals Due Date for Project Manager

Quarterly report for the period of January 1, 2019 - March 31, 2019

Grant Agreement # 07120-OEA-AMP-VTC

It is our pleasure to provide this second quarterly report of activities by Vermont Technical College (the Grantee) on the OEA additive manufacturing curriculum sub-grant. While we had minimal financial activity to report in this quarter, work has begun in earnest toward the outcomes specified in our scope of work.

As reported earlier, we anticipate the bulk of the work being completed in this current quarter, as outlined in the following individualized work plans for the Principal Investigator and faculty members involved. Each individual is pursuing their individual scope as their teaching schedule allows, so progress thus far, by design, has been incremental.

The Principal Investigator worked closely with the State in January and February on the Bid Review process for selecting a vendor to assess the AM environment and develop the consortium. This involved a series of conference calls and asynchronous email communication.

A series of curriculum development meetings took place in January and February. Participants included faculty participating in this project, as well as other faculty that will be involved in the planning and delivery of the new curriculum at VTC. This process also resulted in the divvying up of research responsibilities, as articulated in the work plans below.

Faculty Researcher Dan Costin traveled to RPI in February to research how AM is addressed at that institution; met with faculty, toured the labs, studied the curriculum and shared the results with other faculty involved in the project.

**Activities:**

* + Principal Investigator:
    - Work collaboratively with the State and Consortium Project Manager in the feasibility, planning, and implementation stages of the Vermont Additive Manufacturing Partnership. Item 1 of Attachment A of the VTC subgrant agreement.
    - Overall responsibility for the professional development and research necessary for the successful creation of a VTC course in additive manufacturing. This course must serve both traditional and non-traditional students. Items 2 and 3 of Attachment A of the VTC subgrant agreement.
    - 100 hours
    - Research:
      * + Specific responsibility for research in the area of Design for Additive Manufacture. This includes, but is not limited to:
        + Part integration
        + Part functionality/complexity
        + Conformal cooling
        + Topological optimization
        + Point cloud data
        + Create notes and summary of notes for the benefit of others
        + 45 hours
    - MIT Online course: Additive Manufacturing for Innovative Design and Production Level II
      * Successfully complete the course
      * Create notes and summary of notes for the benefit of others
      * 60 hours
    - Trip to MIT or similar leader in Additive Manufacturing education
      * Complete trip and networking
      * Create notes and summary of notes for the benefit of others
      * 15 hours
    - Conduct initial project research
      * 10 hours
    - Complete ToolingU (SME) Additive Manufacturing Course
      * 8 hours
    - Participate in project meetings as required
  + Faculty Researcher:
    - Specific responsibility for research in the areas of:
      * Powder bed fusion, Binder jetting, Directed energy deposition – including relevant material science, post-processing, and safety
      * Integrating AM with traditional manufacturing & AM as secondary process
      * Impact of AM on manufacturing process, Service bureaus (impact of AM on business)
      * Create notes and summary of notes for the benefit of others
      * 54 hours
    - Trip to Edison Welding Institute or similar leader in Additive Manufacturing outreach to, and cooperation with, industry
      * Complete trip and networking
      * Create notes and summary of notes for the benefit of others
      * 19 hours
    - Trip to Rensselaer Polytechnic Institute or similar leader in Additive Manufacturing education
      * Complete trip and networking
      * Create notes and summary of notes for the benefit of others
      * 11 hours
    - Conduct initial project research
      * 2 hours
    - Complete ToolingU (SME) Additive Manufacturing Course
      * 8 hours
    - Participate in project meetings as required
  + Faculty Researcher:
    - Specific responsibility for research in the areas of:
      * Extrusion, Material jetting, Vat polymerization, sheet lamination – including relevant material science, post-processing, and safety.
      * Application of AM (titanium medical implants, mass customization, plain bearings, etc).
      * Create notes and summary of notes for the benefit of others
      * 45 hours
    - Conduct initial project research
      * 4 hours
    - Complete ToolingU (SME) Additive Manufacturing Course
      * 8 hours
    - Participate in project meetings as required

**Conclusion:**

We are on track to complete our scope of work as planned and we do not anticipate any issues at this time that will prevent us from meeting project objectives.