**Performance Indicators for University Transportation Centers (UTCs)**
**Reporting Period 5: January-November 2016**

**Part I – Program-Wide Indicators**

Report the program-wide indicator metrics for the completed grant year and for the institution(s) comprising your UTC, unless the indicators are included in Part II below. In the event that a sub-grantee university participates in more than one UTC, include only the metrics corresponding with your grant.

| **Program-wide Indicators** |
|---|
| 1. Number of transportation-related courses offered during the reporting period that were taught by faculty and/or teaching assistants who are associated with the UTC:<br>· Undergraduate courses _____8_____<br>· Graduate courses _____10_____ |
| 2. Number of students participating in transportation research projects funded by this grant.<br>· Undergraduate students _____0_____<br>· Graduate students _____4_____ |
| 3. Number of transportation-related advanced degree programs that utilize grant funds to support graduate students:<br>· Master's Level Programs _Three, one at each consortium university (TISE @ VTTI; NRC @ Morgan State, and CTS @ UVA)_<br>· Doctoral Level Programs _Three, one at each consortium university (TISE @ VTTI; NRC @ Morgan State, and CTS @ UVA)_ |
| 4. Number of graduate students supported by this grant:<br>· Master's Level Students Supported ___2_____<br>· Doctoral Level Students Supported ___2_____ |
| 5. Number of students supported by this grant who received degrees:<br>· Master's Level Degrees _____2_____<br>· Doctoral Level Degrees _____1_____ |
| 6. Number and total dollar value of research projects selected for funding using UTC grant funds (Federal and/or Recipient Share) that you consider to be applied research: and advanced research:<br>· Applied research projects & dollar value _____1 projects; $50,000.00_____<br>· Advanced research projects & dollar value ____0 projects; $0_____ |

2016 Consortium University Demographic Information:

| | Virginia Tech* | University of Virginia* | Morgan State Univ.* |
|---|---|---|---|
| Tenure and Tenure-track Engineering Faculty | 9[1], 48[2], 356[3] | 20[1], 15[2], 160[3] | 6[1], 5[2], 23[3] |
| Master's Students Enrolled | 49[1], 214[2] | 20[1], 40[2] | 11[1] |
| Master's Degrees Awarded | 15[1], 89[2] | 8[1], 20[2] | 11 [1] |
| Doctoral Students Enrolled | 33[1], 122[2] | 18[1], 30[2] | 6[1] |
| Doctoral Degrees Awarded | 3[1], 26[2] | 6[1], 10[2] | 0[1] |
| Transportation Graduate-level Courses | 17[1] | 20[1] | 30[1] |
| Students Funded by Assistantships or Scholarships | 22[1], 185[2] | 36[1], 60[2] | 2[1] |
| Undergraduate Students Enrolled in Engineering[3] | 7,917 | 2,700 | 1,006 |
| Graduate Students Enrolled in Engineering[3] | 2,342 | 700 | 114 |
| Total Undergraduate Enrollment[4] | 25,791 | 15,669 | 5,838 |
| Total Graduate Enrollment[4] | 6,890 | 6,316 | 1,137 |
| Total University Enrollment[4] | 32,681 | 21,985 | 6,975 |

* Note that the final numbers for 2016 may not have been available at all universities due to early reporting time frame, and thus projections were used for some data fields.

[1] Transportation-related only, [2] Civil Engineering only, [3] All Disciplines, [4] University-wide

**Part II – UTC-Specific Indicators**

Report here the annual performance metrics that you identified in your application for each category below, include the description of the indicator and the corresponding metric.
In the event that a sub-grantee university participates in more than one UTC, include only the metrics corresponding with your grant.

| Category | Metrics with Descriptions from FY 2012 Grant |
|---|---|
| 1. Research Capability | - Number of inner-consortium research papers received and funded: due to grant funding ending during this reporting period (November 2016), only 1 research project received additional funding in 2016. This project (Mobile User Interface Development for the Virginia Connected Corridors) was the capstone project of the CVI-UTC, which took the results of the preceding 23 CVI-UTC research projects and developed viable real-world applications for ultimate deployment.<br>- Number of outside university submission for research participations in the CVI-UTC and utilizing CVI-UTC resources, such as the CV Fleet and the two testbeds: due to grant funding ending during this period (November 2016), no new calls for research were extended outside the CVI-UTC consortium.<br>- Number of outside university collaborations on research with CVI-UTC consortium researchers: 0; as all research activities concluded during this reporting period, no new collaborations were made.<br>- Number of members: stakeholders, subject matter experts, and researchers participating in the CVI-UTC: 67.<br>- Number of graduate students participating in and taking a lead role in a CVI-UTC research project: 4 – as all remaining research activities were completed during this period, the number of students participating in CVI-UTC research projects was lower than during previous reporting periods.<br>- Number of research teams and research papers from the CVI-UTC that were recognized and accepted by national and international transportation conferences and institutions: 51; including papers accepted by and presented at the Transportation Research Board (TRB) Annual Meetings, ITS America, 5th International Symposium on Naturalistic Driving Research, and at international conferences such as the 19th IEEE Intelligent Transportation Systems Conference, Rio de Janeiro, Brazil, and many other prestigious national and international conferences. |

| Category | Metrics with Descriptions from FY 2012 Grant |
|---|---|
| 2. Leadership | In addition to the traditional UTC performance metrics described previously (e.g., publications, students graduated, patents awarded, etc.), the Consortium will track several measures that relate to the CVI-UTC impact upon the national and international transportation communities. These measures include: a) growth in both private and public sector partners and stakeholders; b) numbers of CVI applications developed, improved, or evaluated that are adopted (or planned for future adoption) by private or public sector entities; and c) impacts on the design of deployed (or pre-deployment) CVI technologies.<br>- Growth in both private and public sector partners and stakeholders: the CVI-UTC continued to grow their private and public sector partners and stakeholders during this period, including a continuing relationship with Iteris to develop, deploy, and maintain equipment along the Northern Virginia and Smart Road Connected Vehicle Test Beds, continuing communication with Transurban to implement applications developed under a CVI-UTC research project, collaboration with HERE to develop the next generation of connected and automated data services and device applications, and continued conversations with the District of Columbia Department of Transportation (DDOT) to expand the Northern Virginia Connected Vehicle Test Bed across the Potomac River and into the District region.<br>- Number of CVI applications, developed, improved, or evaluated that are adopted (future adoption): 23 over the course of the grant; all research activities were completed by or during this reporting period, with all completing experimental activities which designed, developed, improved or evaluated CVI applications.<br>- Impacts on design of deployed (pre-deployment) CVI Technologies: During this period, all CVI-UTC research projects completed experimental activities, including several which occurred on the Northern Virginia and Virginia Smart Road Connected Vehicle Test Beds. The test beds have allowed for growth opportunities with various stakeholders, including additional funding support through VDOT and VCTIR to further the current deployment efforts. In addition, the mobile application developed as part of the CVI-UTC research project "Mobile User Interface Development for the Virginia Connected Corridors" is transferring technology by providing drivers in Northern Virginia a downloadable user interface application where drivers can receive traveler information messages from the VDOT traffic operation systems and make reports of driving conditions back to a cloud system, actualizing the results of many CVI-UTC research projects. This research project is currently continuing through external funding with deployment expected in the near future. |
| 3. Education and Workforce Development | The performance metrics that are currently tracked by the consortium universities and that will be used to measure the effectiveness of the CVI-UTC education and workforce development activities include: a) The number of graduate students funded under the program; b) The number of M.S. and Ph.D. graduates each year; c) A tracking of the placement of the graduate students after completion of their degrees; d) The number of summer internships offered to undergraduate students; e) The number of under-represented students funded by the CVI-UTC; f) The number of continuing education short-course offerings and the number of attendees; and g) The number of K-12 students attending the School Day event. These statistics will be compiled on an annual basis, and mid-course adjustments may be made to address any deficiencies in achieving the desired measures.<br>- Number of graduate students funded under the UTC: 4<br>- Number of M.S. and Ph.D. graduates: 2 M.S., 1 Ph.D.<br>- Placement after graduation: 3; all graduates were placed in employment post-graduation at private engineering practices or public institutions, or continuing on to pursue higher education.<br>- Summer internships offered to undergraduate students: 0; as the grant funding period ended in November 2016, all activities were focused on close-out processes and thus no internships were offered during this period.<br>- Number of underrepresented students funded under the UTC: 3, many CVI-UTC funded students have been from underrepresented groups, and is largely due to the consortium partnership and the commitment of the UTC to support underrepresented students in STEM education and careers.<br>- Number of short courses and other professional presentations, and attendees: 0;0.<br>- Number of K-12 students attending School Day: 452 |

| Category | Metrics with Descriptions from FY 2012 Grant |
|---|---|
| 4. Technology Transfer | Performance metrics that the CVI-UTC uses to assess the progress of technology transfer activities include: a) the number of CVI applications developed that result in IP that is either solely developed by the Consortium or developed in conjunction with its public and private sector partners; b) the number of outside universities participating in CVI-UTC open solicitations and their progress in developing or improving CVI applications; and c) the number of participants attending Center workshops, short courses, and distance learning opportunities.<br>- Number of CVI applications developed that result in IP: 0<br>- Number of outside universities participating in open solicitation: 0 (note no solicitations occurred during this period)<br>- Number of outside universities developing or improving CVI applications: 0; all universities involved with developing or improving CVI applications were within the CVI-UTC consortium universities.<br>- Number of participants attending educational events: 3,400<br><br>Although no intellectual property was registered, it is anticipated that this will occur in future years.<br><br>Finally, we have been very successful at holding educational and outreach events at TRB, and through each university educational program. During this last year of funding, we continued our educational and outreach efforts as funding allowed, transferring our research into public consumption. |
| 5. Collaboration | The CVI-UTC Consortium will carefully track the success of collaboration within the Center. The following metrics will be reviewed on a monthly basis and will be used as benchmarks when identifying new projects:<br>- Size of advisory board – As the grant ended during this reporting period (November 2016), all collaborative outreach efforts have been completed and the size of the advisory board of the CVI-UTC was not increased. The 14 members of the advisory board included representatives from Denso, Savari, Kapsch, Volvo, Toyota, Fairfax County, and VDOT/VCTIR.<br>- Average number of investigators per project – Each project will include at least one member from each of the core partners. However, given the breadth of connected-vehicle activities, it will be important to include a variety of investigators from each consortium member. 2-3; there was generally a PI or co-PI team between consortium universities, with at least 1 or 2 graduate students taking on lead research roles in each of the 24 projects. |