CONNECTED VEHICLES-INFRASTRUCTURE UTC:

Thirty Month Update and Review

RESEARCH FUNDING

- There is a current research proposal request out now
- Over the past 2 years of research proposal requesting: over 100 new proposals were received from universities inside and outside of the consortium
- It is unknown how many proposals will be received at this time, but...
- However, due to no additional FY2013 UTC funding, only 5-6 new research projects will be funded (unless projects are low budgets)
- The final goal is making a final total of 25 research projects funded by the UTC grant between 2012 and 2016.
- New research projects will be announced and funded in September 2014 and conclude December 2016.

EQUIPMENT PURCHASED

- **What was purchased?**
  - No major purchases in equipment at this time
  - There will be no additional major equipment purchases, so that the remaining funding will be spent on educational, outreach, and research efforts
  - However, the equipment purchased within the last 12 months is currently being used to expand the Northern Virginia testbed to coincide with the VDOT ATMS project, adding 16 miles of new highway available for connected vehicle research.

EQUIPMENT INSTALLATION AND TESTING

- **Smart Road:**
  - 7 RSE units are currently active on the Smart Road.
  - 2 have the ability to be mobile units, and are able to be adjusted per research project.
  - Current Challenge: Complete research on the Smart Road and collect useful data.
  - Estimated Completion: COMPLETE!

EQUIPMENT INSTALLATION AND TESTING

- **Northern Virginia (Merrifield, VA):**
  - **Phase 1**: 8 RSEs will be installed on I-66 (October 2012).
  - **Phase 2**: Routes 29 and 50 (est. 18 RSEs; Fall 2012).
  - **Phase 3**: Gallows Road and I-495 (est. 18 RSEs).
  - Current Challenges:
    - Begin research on the I-66 testbed; we've already proven that it works, but we need to get connected vehicle fleet cars up to test in NOVA
    - Maybe work to do more demonstrations on the I-66 testbed, since it appears that there is a lot of interest in this from outside sources
  - Estimated Completion: COMPLETE!

EQUIPMENT INSTALLATION AND TESTING

- **Northern Virginia (I-66 Expansion):**
  - RSE Location Scouting will take place as early as January 2015.
  - Scouting will be easy because it coincides with a current VDOT project and will allow easy installation to concur at this time.
  - I-66 RSE coverage will expand from Nutley Street, westward, ending in Gainesville, VA – for an additional 16 miles of coverage
  - Current Challenges:
    - Complete expansion and ensure good signal strength and communication for data collection, it will be important as semi-autonomous projects begin.
    - Would like to create a video or animated simulation of the I-66 testbed capabilities to travel the benefits of this testbed for outreach and education events
  - Estimated Completion: Spring/Summer 2015 (depending on winter weather and getting started)

EDUCATION

- Morgan State National Summer Transportation Institute for Baltimore-area high school students
- Morgan State Teacher Transportation Institute for Baltimore-area high school teachers
- VTTI School Days Outreach (K-12 students, teachers, parents)
- VTTI Open House (Virginia Tech, Blacksburg, Southwest Virginia residents)
- UVA Transportation Training Academy
- Connected Vehicle Derby at Moss Center for the Arts
- Institute for Industrial Engineers Conference
- Kids Tech University at Virginia Tech Cassell Coliseum
- Speak Out/YOVASO Connected Vehicle Demonstration
- VDOT High School Career Fair in Manassas, VA
- Virginia Science Festival Connected Vehicle Demonstration
- Transportation Undergraduate Research Fellowship (TURF) Program

EDUCATION

- **Transportation Undergraduate Research Fellowship (TURF)**
  - In the summer of 2014, two undergraduate students were funded to be a part of this new research program.
  - Both were female students
  - One student worked with pavement research and the other student worked in Connected Vehicle research
  - It is anticipated that these students will continue as graduate students in transportation and continue to work within the UTC for the final two years.
  - Each student worked between May-August with a final poster presentation on July 31, 2014 at the Inn at Virginia Tech.
  - Overall cost to the program was equivalent to $8000.00.

OUTREACH

- Morgan State National Summer Transportation Institute for Baltimore-area high school students
- Morgan State Teacher Transportation Institute for Baltimore-area high school teachers
- VTTI School Days Outreach (K-12 students, teachers, parents)
- VTTI Open House (Virginia Tech, Blacksburg, Southwest Virginia residents)
- UVA Transportation Training Academy
- Connected Vehicle Derby at Moss Center for the Arts
- Institute for Creativity Arts and Technology Open House
- US DOT Datapalooza/GMAT Conference in Washington DC
- Virginia Tech Staff Appreciation Day Connected Vehicle Demonstration
- VDOT/VCTIR Connected Vehicle Demonstration
- Institute for Industrial Engineers Conference
- Kids Tech University at Virginia Tech Cassell Coliseum
- Speak Out/YOVASO Connected Vehicle Demonstration
- Rally for Road Safety for the County of Roanoke, VA
- VDOT High School Career Fair in Manassas, VA
- Virginia Science Festival Connected Vehicle Demonstration
- Blacksburg Community Day Connected Vehicle Demonstration
- Transportation Undergraduate Research Fellowship (TURF) Program

OUTREACH

- **ITS World Congress (Detroit, MI, September 7-11, 2014)**
  - We will be providing a booth, speakers, presenters, and a major demonstration component featuring UTC research
- **TRB Annual Meeting (January 2015)**
  - We will be providing a booth, speakers, presenters, and a reception (funded by foundation, not the grant)
- **We completed an application to ARTBA for hosting the 2016 UTC Conference, a major goal of our center.**
- **Working with groups like YOVASO; Virginia Tech, UVA, Morgan State student and community groups; Roanoke County Rally for Road Safety, among many other invitations.**

UPCOMING CHALLENGE: RESEARCH

- **Additional Research Calls in 2014-16?:**
  - It is unlikely without FY2013 UTC funding that research beyond the final 5-6 selections at the start of 2014 will be funded; however, it is currently being debated by the Advisory Board if the UTC will apply for the FY2015 UTC funding and if accepted, that will fund additional research calls into 2016 and 2017.
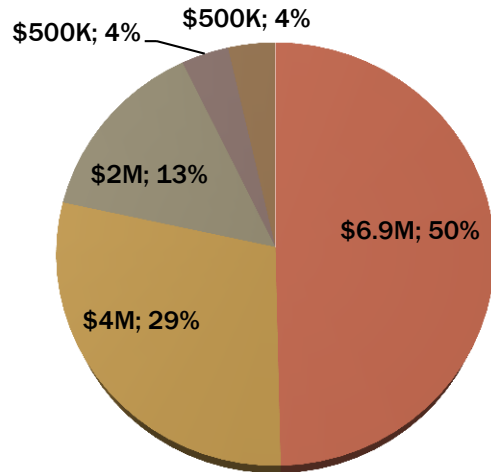
UPCOMING CHALLENGE: EQUIPMENT

- **Installations for the available vehicles to be highly instrumented for research**
  - 4 motorcycles, 6 light vehicles and the motorcoach and the semi-truck for an initial fleet of 12.
  - More connected technology pedestrian applications.
- **Installation and customization of OBEs and DAS**
- **Signal Phase and Timing Applications**
  - More Northern Virginia Research, which will be the goal of the newly funded research projects
- **Resource Sharing during research in 2015**
  - Using vehicles for research in NOVA (vehicles moved in May 2014, available for use by researchers currently).
  - Allowing all researchers access to equipment in a timely manner
  - We can work directly with Ray Resendes on this; initial discussion of housing the fleet vehicles at VT Arlington parking garage because of high security levels and close proximity to I-66
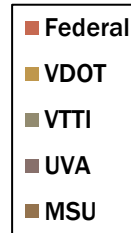
UPCOMING CHALLENGE: FUNDING & REPORTS

- Tentative plan to apply for the UTC FY2015 (that most likely will take place in December 2014).

- CVI-UTC was not awarded FY2013 funds. This will not hinder research or reporting for FY2011 end date in 2016 – however, not as many research efforts will be able to be funded until FY2015 consideration.

- Planned projects will go forward and be completed with the remainder of the FY2011 grant.
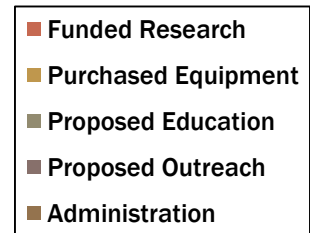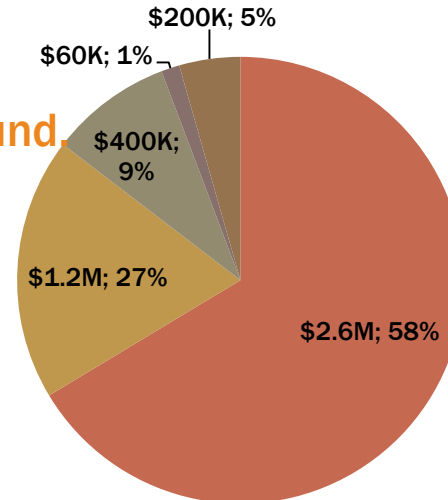
OLDER FUNDING GRAPHS & CHARTS

CVI-UTC Funding Sources

$500K; 4%
$500K; 4%
$2M; 13%
$4M; 29%
$6.9M; 50%

Legend:
- Federal
- VDOT
- VTTI
- UVA
- MSU

About $4.46M of funding is currently committed to various UTC projects of research, outreach and education.
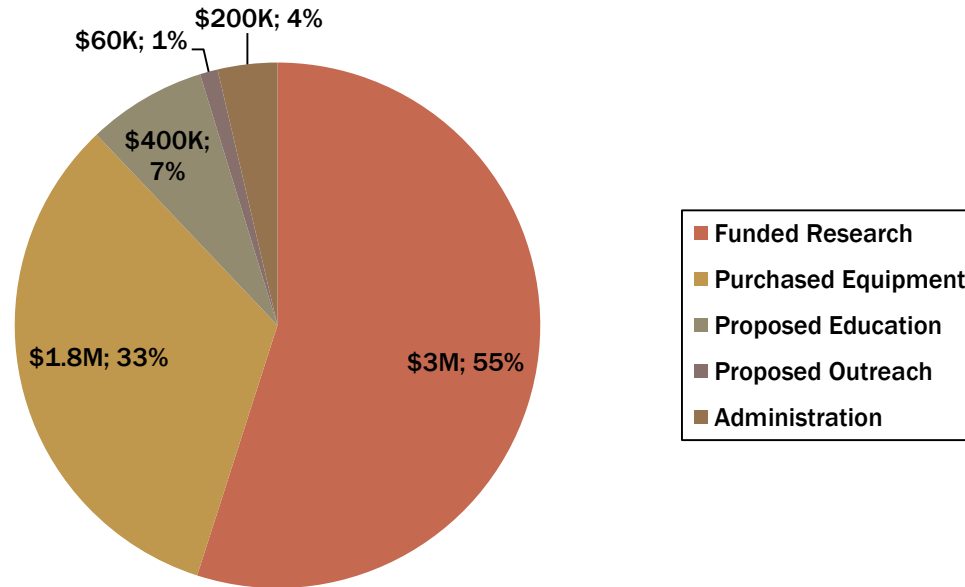
This commits about 32% of the initial $13.9M fund.

(However, this "spent percent" could be higher, maybe closer to 45% funds committed, since cost-matching funds are not all spendable dollars.)

Used Funds as of Winter 2013

$200K; 5%
$60K; 1%
$400K; 9%
$1.2M; 27%
$2.6M; 58%

Legend:
- Funded Research
- Purchased Equipment
- Proposed Education
- Proposed Outreach
- Administration

FY2013 PLANNED FUNDING GRAPH

FY2013 Planned Funding

Pie chart legend:
- Funded Research
- Purchased Equipment
- Proposed Education
- Proposed Outreach
- Administration

Chart values:
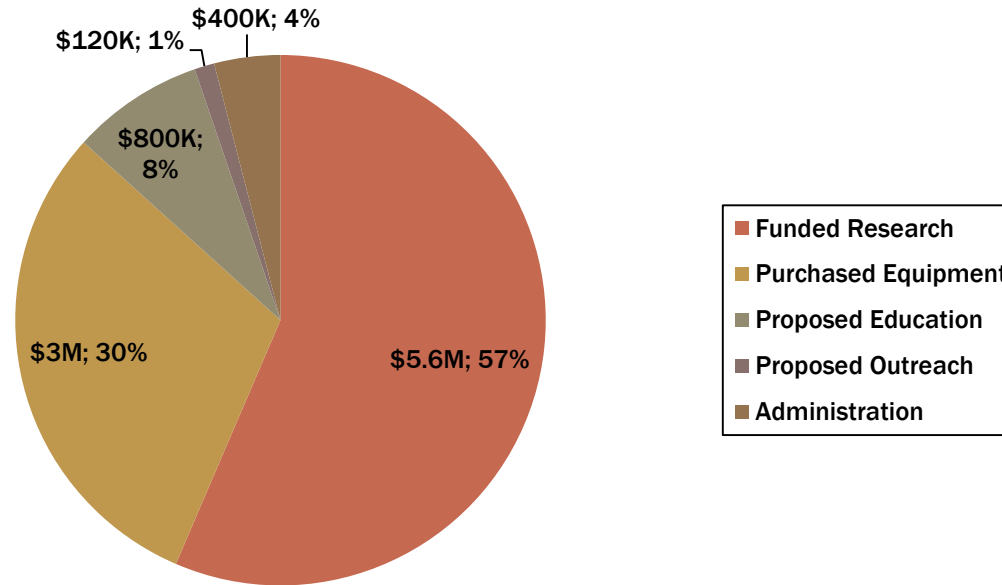- $3M; 55%
- $1.8M; 33%
- $400K; 7%
- $60K; 1%
- $200K; 4%

Similar to FY2012 spending, with additional funding going towards testbed expansion (equipment) and to fund research expenditures ($300K for outside consortium projects).

Outreach stays the same with TRB and ITS America attendance; Education changes tactics from 10-20 short courses, to 1-2, larger, collaborative educational events; but with same funding amount– no increase or decrease.

TOTAL FUNDS SPENT IN FY2012-13

Total Spent by 2014

Funded Research — $5.6M; 57%
Purchased Equipment — $3M; 30%
Proposed Education — $800K; 8%
Proposed Outreach — $120K; 1%
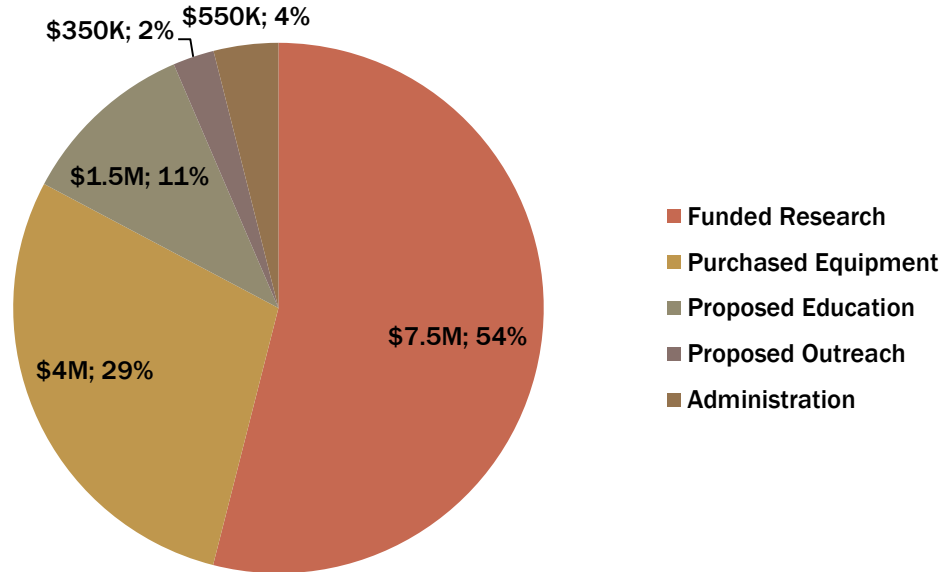**Administration** — $400K; 4%

This commits about 72% of the initial $13.9M fund.

(However, this "spent percent" could be higher, maybe closer to 85% funds committed, since cost-matching funds are not all spendable dollars.)

Remaining grant funds come from university consortium members individual cost-share investments in the CVI-UTC; this funding will be used to manage the center administratively until 2016 without major investments in new research, educational, outreach projects as in FY 2012 & FY2013.

PROJECTED FINAL EXPENDITURES 2014

Final Expenditures (Goal Seek)

$350K; 2% $550K; 4%

$1.5M; 11%

$4M; 29%

$7.5M; 54%

- Funded Research
- Purchased Equipment
- Proposed Education
- Proposed Outreach
- Administration

Major reasoning for suggested final expenditure outcome:

- $4M in Equipment matches VDOT's total match contribution (testbed/deployment)
- $7.5M in Research exceeds initial RITA grant in a significant way; verifying primary commitment to the value of research by UTC consortium
- Both education and outreach increase a bit more from past fiscal years, as completed UTC research would be distributed through those two types of events
- Administration remains constant over 3 years of about $200K/yr. spent 2012-14