CONNECTED VEHICLES-INFRASTRUCTURE UTC:

Twenty-Four Month Update and Review

MORGAN STATE UNIVERSITY

VirginiaTech Transportation Institute

UNIVERSITY *of* VIRGINIA

RESEARCH FUNDING

- **There were additional research proposals received over the past 6 months informally**
- **Up to 30 new proposals were received from universities inside and outside of the consortium**
- **Making a total of 40 proposals up for Winter 2014 funding consideration**
- **However, due to no additional FY2013 UTC funding, only up to 6 new research projects will be funded**
- **Making a final total of 25 research projects funded by the UTC grant between 2012 and 2016.**

RESEARCH FUNDING

- Because of the overwhelming interest and demand, the UTC executive leaders will have to narrow down the research selection from 40 to 10 considerations.

- The final 10 research proposals up for consideration will be read and voted on by the UTC Advisory Board as early as TRB (January 2014).

- The new 6 approved research projects will be funded from 2014-2016 (to the end of the life of the grant).

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 2014.
  - 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 2014 (depending on winter weather and getting started)

EDUCATION

- **VTTI 25th Year Anniversary and Open House**
  - On November 15th, 2013 VTTI held an open house, tour, and reception for major public and private corporate sponsors and New River Valley community members
  - The CVI-UTC had a major role in showcasing the future of VTTI research and technological applications, as well as showcasing the use and storage of "big data" used in collecting data and basic safety message communications.
  - Connected vehicles and motorcycles from the research fleet were also on display.
  - A tour of the Smart Road with a feature on the testbed capabilities and the research that the UTC completes research on and research examples and posters were given and displayed.

EDUCATION

- **CVI-UTC April Educational Event (April 5, 2014)**
  - **Major collaboration between VTTI and ICAT (http://www.icat.vt.edu/) with participation by VDOT, Carillion Medical Clinics, Roanoke County State Police, and VT SGA.**
  - **Features:**
    - **Connected Vehicles (demonstration by CVI-UTC team)**
    - **Automated Vehicles**
    - **Research and Design Elements from ICAT**
    - **Green Highway Initiative**
    - **Teen Safe Driving**
      - **Distracted Driving**
      - **Safe Highway Driving**
      - **Best Practices for driving and vehicle ownership/insurance/etc.**

UPCOMING PLANNED OUTREACH 2014

- **TRB Annual Meeting (January 2014)**
  - We will be providing a booth, speakers, presenters, and a reception (funded by foundation, not the grant)
- **SAE Annual Meeting (January 2014)**
- **We completed an application to ARTBA for hosting the 2015 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?:**
  - Who to call?
    - We will do an inner consortium call first; But we will also be doing a concurrent outside consortium research call for relevant research from other universities and institutions
  - Should we hold another (a 5th, or even 6th) call?
    - It is unlikely without FY2013 UTC funding that research beyond the final 6 selections at the start of 2014 will be funded; however, we will apply for the FY2015 UTC funding and if accepted, that will fund additional research calls into 2016 and 2017.

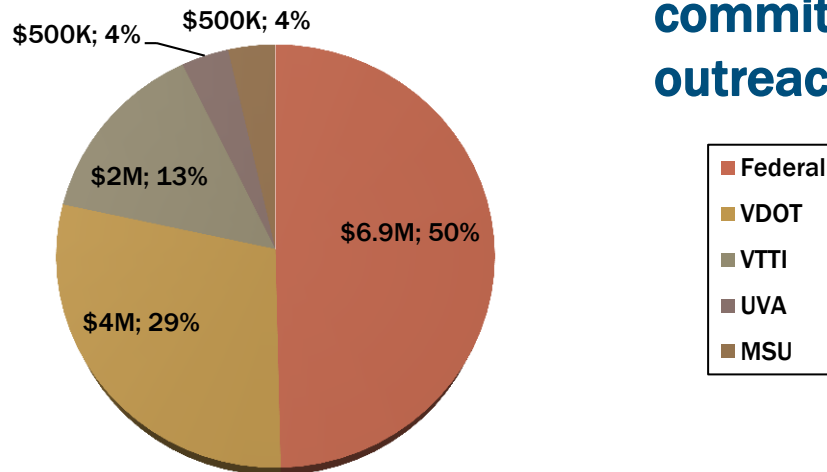# UPCOMING CHALLENGE: EQUIPMENT

- **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.**
- **Installation and customization of OBEs and DAS**
- **Resource Sharing during research in 2014**
  - **Using vehicles for research in NOVA**
  - **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

- We will apply to the FY2015 application 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
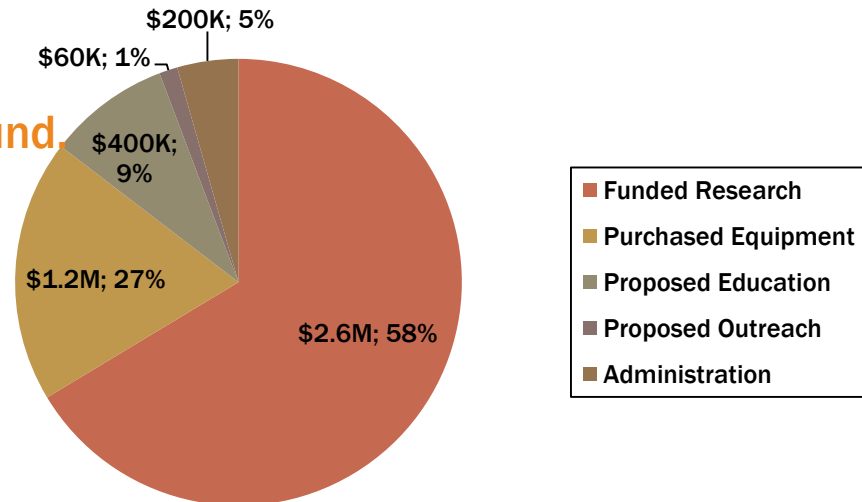- VDOT
- VTTI
- UVA
- MSU

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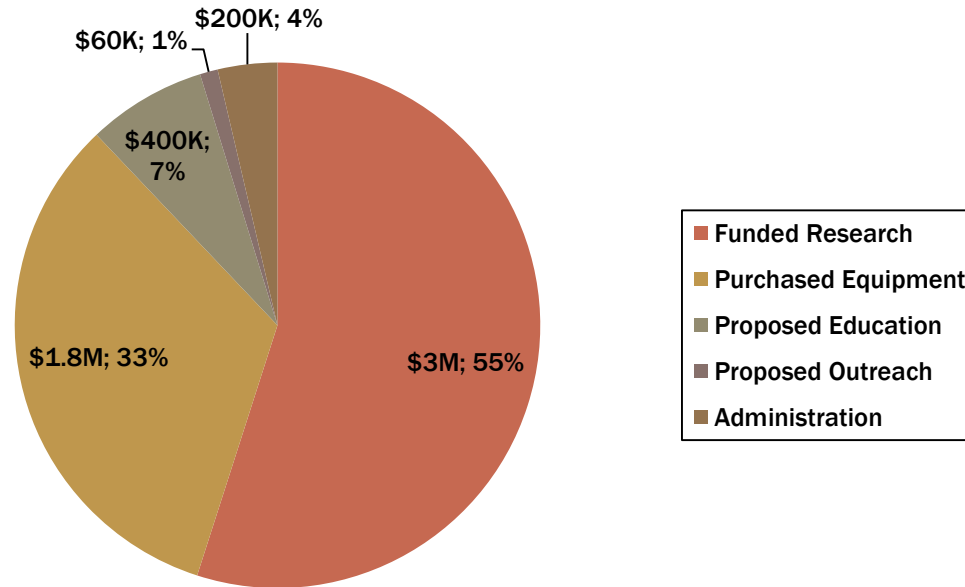
This commits about 32% of the initial $13.9M fund.

(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

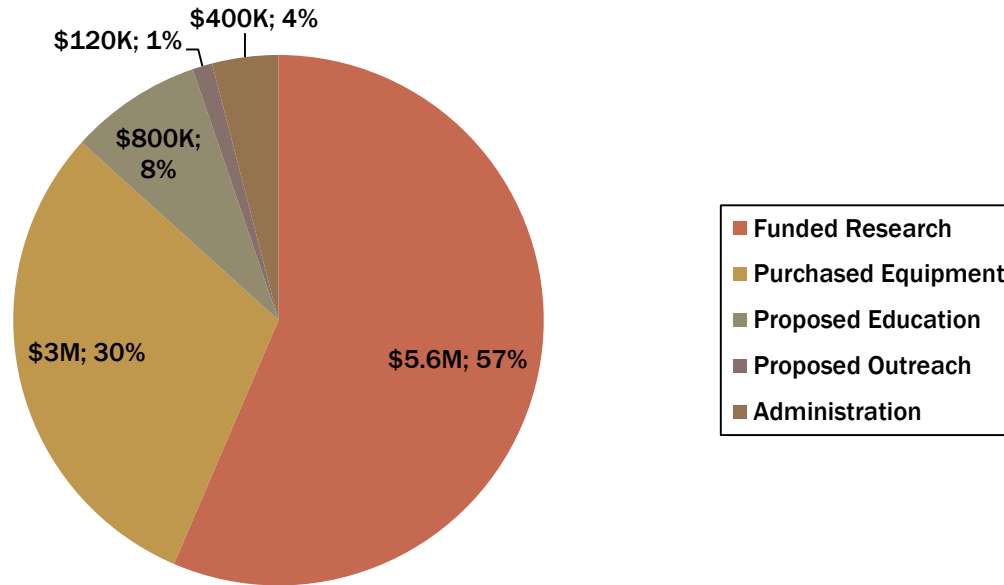# FY2013 PLANNED FUNDING GRAPH

FY2013 Planned Funding

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
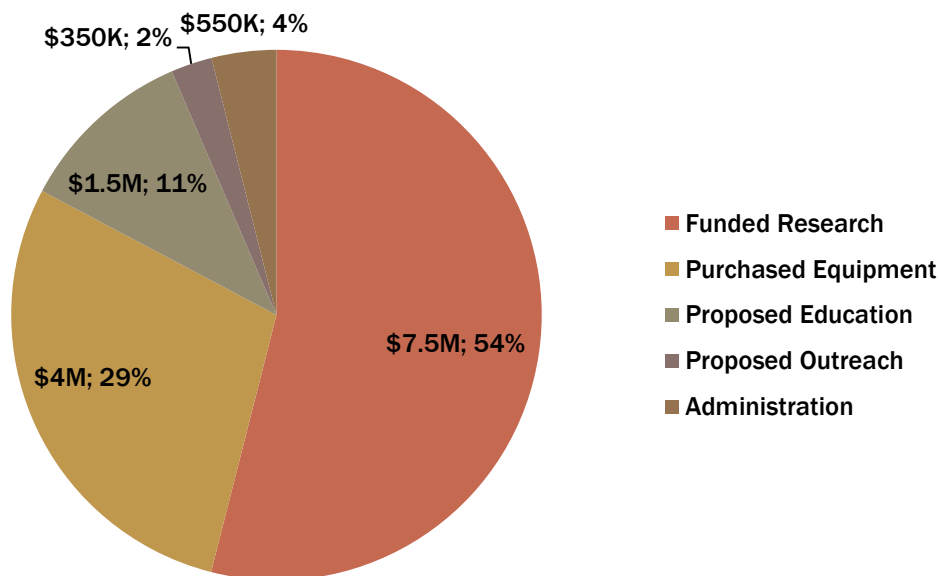
Total Spent by 2014

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)

Pie chart legend:
- Funded Research — $7.5M; 54%
- Purchased Equipment — $4M; 29%
- Proposed Education — $1.5M; 11%
- Proposed Outreach — $350K; 2%
- Administration — $550K; 4%

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

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