



NORTH CAROLINA

Department of Transportation



NCDOT Research Overview

Neil Mastin, P.E. – R&D Manager

October 17, 2019

NCDOT Research Program Basics

Components of the NCDOT Research Program

Contract Research
– Primarily with
Universities

In-house Research

Technology
Transfer (T²) and
Implementation
Support

Short-term
Technical
Assistance

State and National
Program
Coordination and
Support

Research Library
and Reference
Services

Why do we conduct research?



What do we research?



Who conducts research?

Universities



Consultants



Annual Research Program

Match NCDOT research needs with expertise at universities and transportation research centers



Initiate ~20 - 30 new projects per year

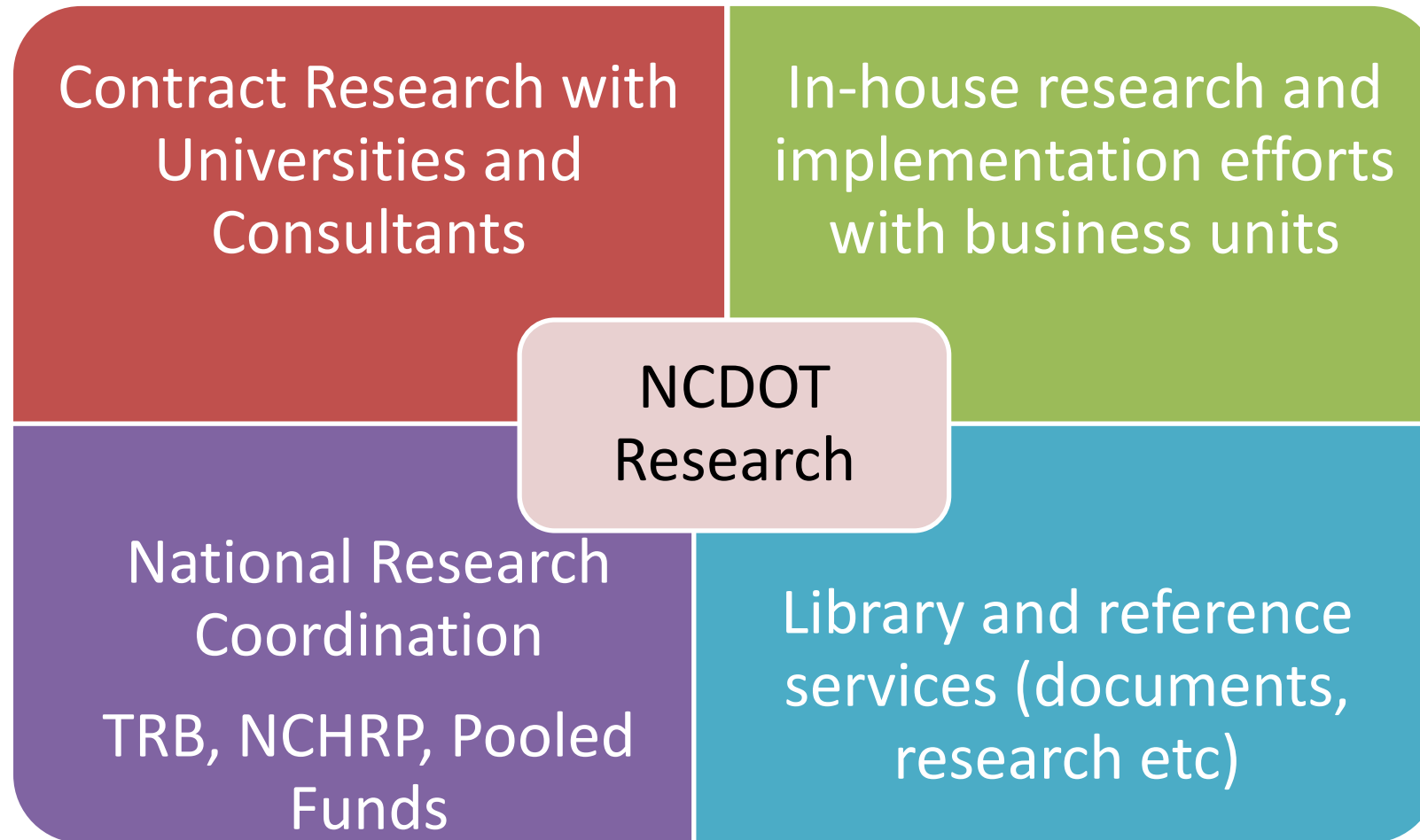


More than 100 active research projects and programs



Nearly all NCDOT activities are eligible for research funding

Research and Development Office Roles



Research Library Services



Located in Century Center, Building B

On-staff Librarian, Lamara Williams-Jones, provides reference and research services

Many engineering and transportation related books, journals, specs and other documents

Historical information to the 1920s

Board of Transportation Minutes

Online Catalog: <http://ncgov.nccardinal.org/eg/opac/home>

Universities Engaged in Research

Appalachian State*

East Carolina*

Elizabeth City State*

Fayetteville State*

NC A&T*

NC Central*

NC State*

UNC-Asheville*

UNC-Chapel Hill*

* Master Agreements

UNC-Charlotte*

UNC-Greensboro

UNC-Wilmington*

Indiana State*

Michigan State*

Virginia Tech*

Central Florida*

Illinois

Auburn

Current Research

Master Agreements – A Key Component

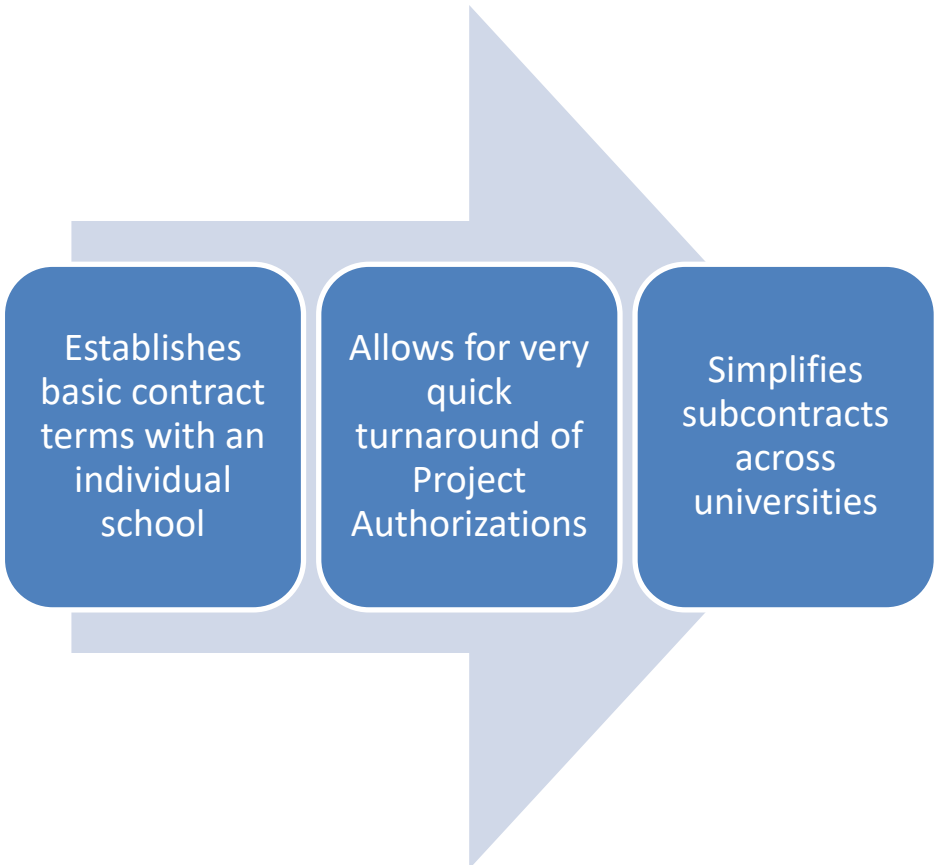
CONTRACT MA 2019-01

STATE OF NORTH CAROLINA

COUNTY OF WAKE

MASTER AGREEMENT FOR SERVICES FOR RESEARCH, STUDIES AND TRAINING PROJECTS

This Agreement is entered into as of the 8th day of April 2019, by the NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, (hereinafter called the “Department”), and NORTH CAROLINA STATE UNIVERSITY, a nonprofit educational institution organized and existing under the laws of the State of North Carolina, (hereinafter called the “University”),

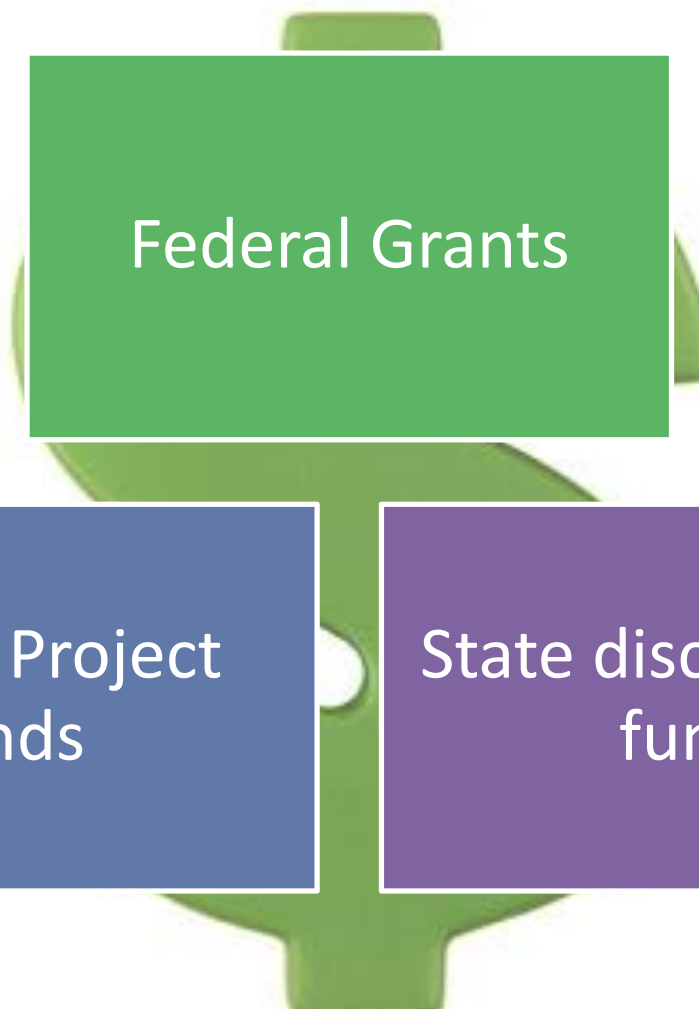


Establishes
basic contract
terms with an
individual
school

Allows for very
quick
turnaround of
Project
Authorizations

Simplifies
subcontracts
across
universities

How is NCDOT Research Funded?



Federal State
Planning and
Research (SPR)

Federal Grants

State Highway
Funds

Federal Project
Funds

State discretionary
funds

Program Development

Frequently Asked Questions about Research Projects

How long do Research Projects Last?

2 years is typical
(Masters Program Length)

Can be as short as 3 months or as long as 3 years

Goal is to get the work done in an appropriate timeframe

What do we pay for in projects?

PI Salary/Release Time

Graduate and undergraduate student and postdoc Stipends

Graduate student tuition

Equipment / Supplies / Materials

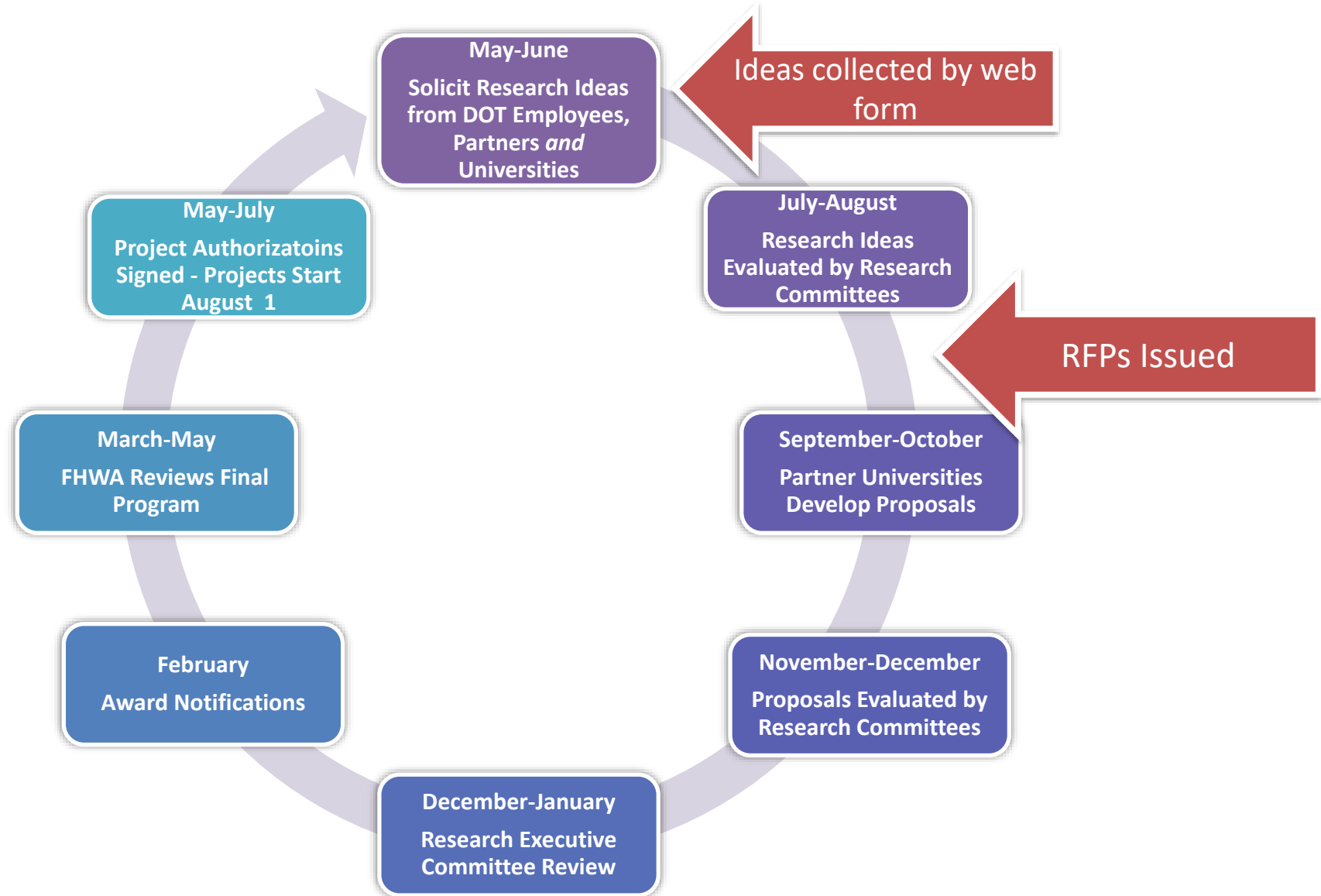
How are Projects managed?

Research Unit handles fiscal and contract portion

Steering Committee oversees every project and reviews technical content

Committee Chair is often the idea submitter

Research Program Annual Timeline



Project Selection Oversight

Research and Development Unit Oversees Overall Program

Solicits Ideas

Research Engineers Manage Projects

Coordinate all Activities

Research Subcommittees Review and Recommend Proposals for Funding

Environmental

Structures and Geotech

Pavement, Materials, Maintenance

Planning, Policy and Transit

Traffic, Mobility and Safety

Research Executive Committee Approves Work Program

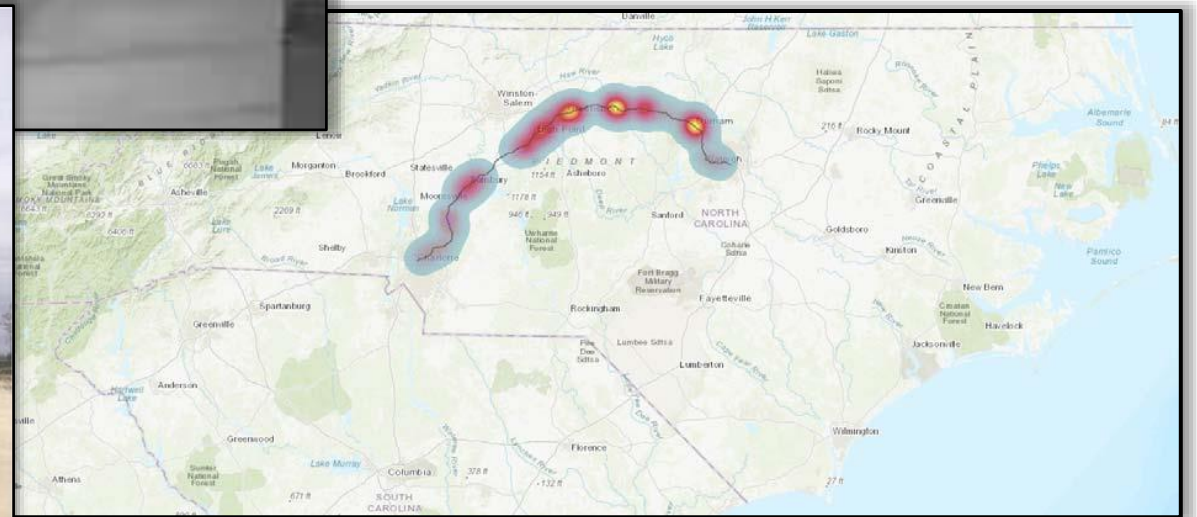
Senior Management

Executives

Example Recent Projects

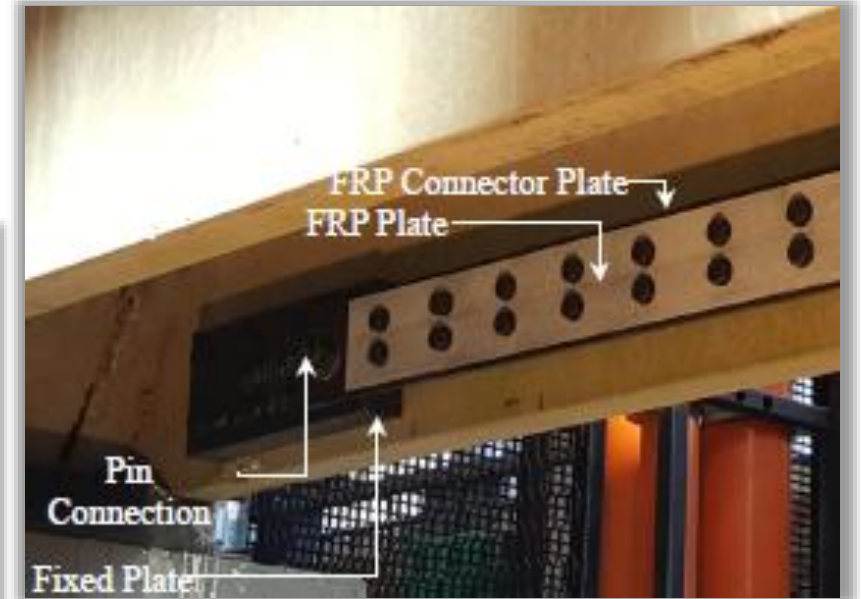
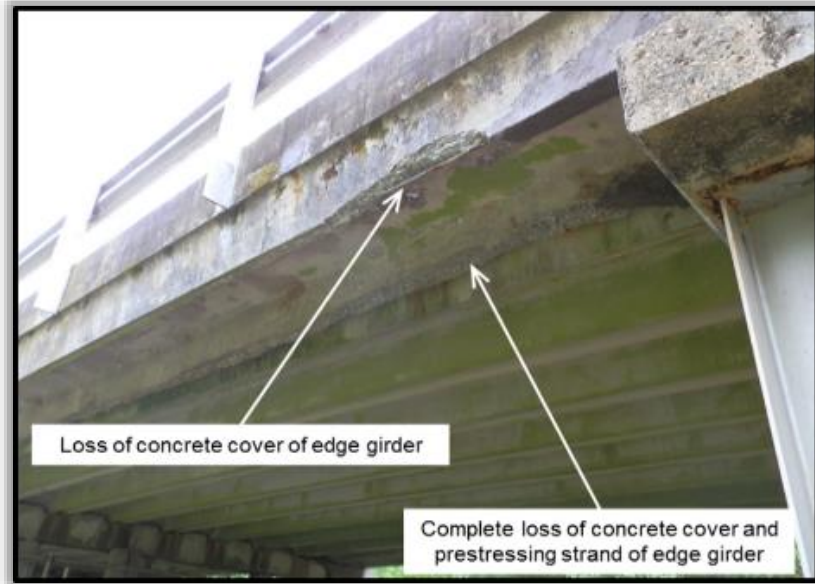
2017-15 Rail Corridor Trespass Severity Assessment

<https://connect.ncdot.gov/projects/research/pages/ProjDetails.aspx?ProjectID=2017-15>



2018-16 Mechanically Fastened CFRP to Retrofit Prestressed Concrete and Steel Bridge Beams

<https://connect.ncdot.gov/projects/research/pages/ProjDetails.aspx?ProjectID=2018-16>



RP2020-023: UAV Enabled Bridge Inspection

<https://connect.ncdot.gov/projects/research/Pages/ProjDetails.aspx?ProjectID=2020-023>



Investigating the use of UAV bridge inspection as a safe and economical alternative.




Testing and evaluating the performance of commercially available platforms for bridge inspections.



Developing flight control techniques to enhance the performance of UAVs in high turbulent flows.

RP2020-037: Economic Impacts of Transit Investments, Social Challenges, and Strategies for Sustaining High Ridership

<https://connect.ncdot.gov/projects/research/Pages/ProjDetails.aspx?ProjectID=2020-37>



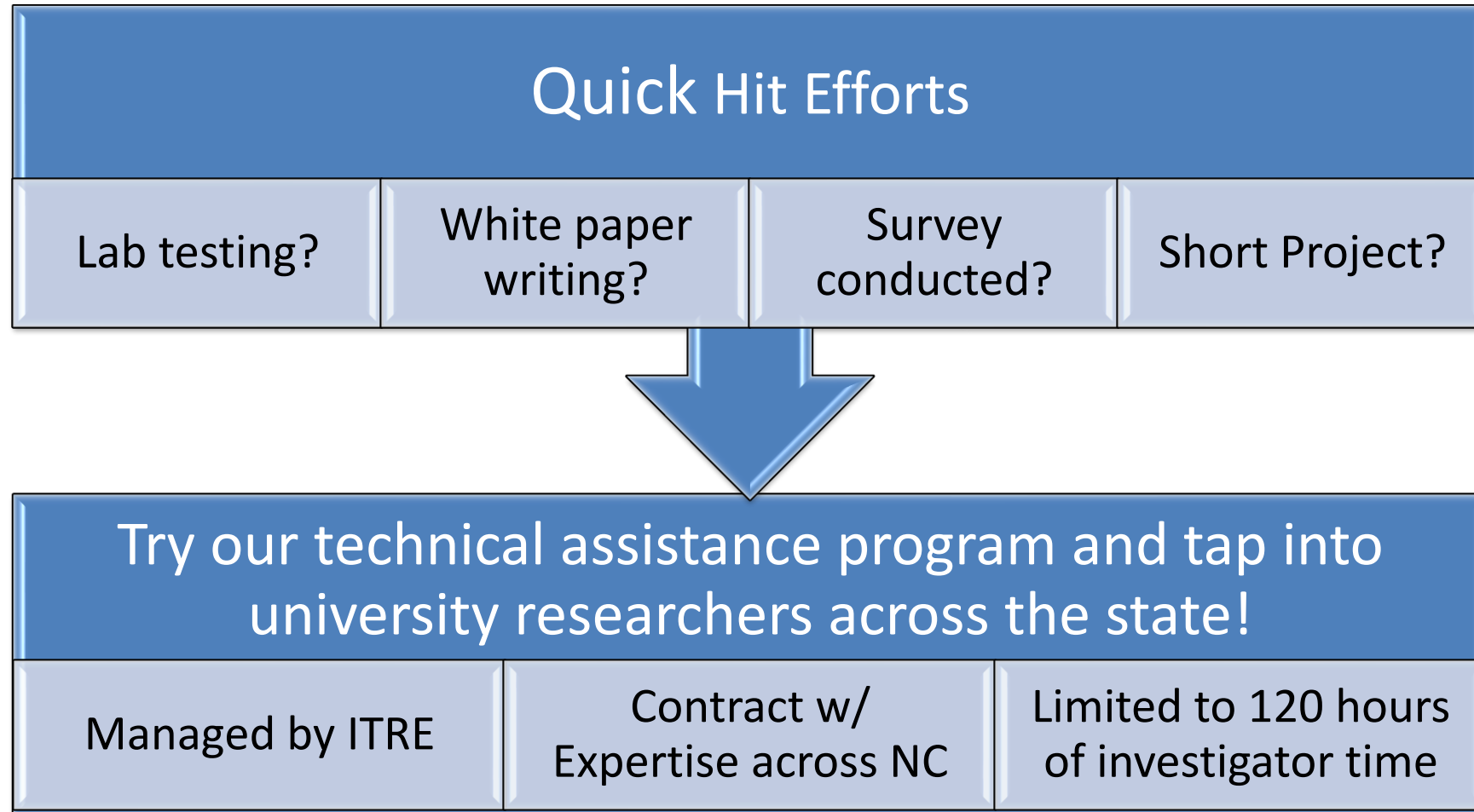
Understanding the transformations expected to occur in urban areas due to transit investments.

Quantify spatial distribution of economic impacts of transit investments

Estimate expected socioeconomic changes in the regions close to the proposed projects.

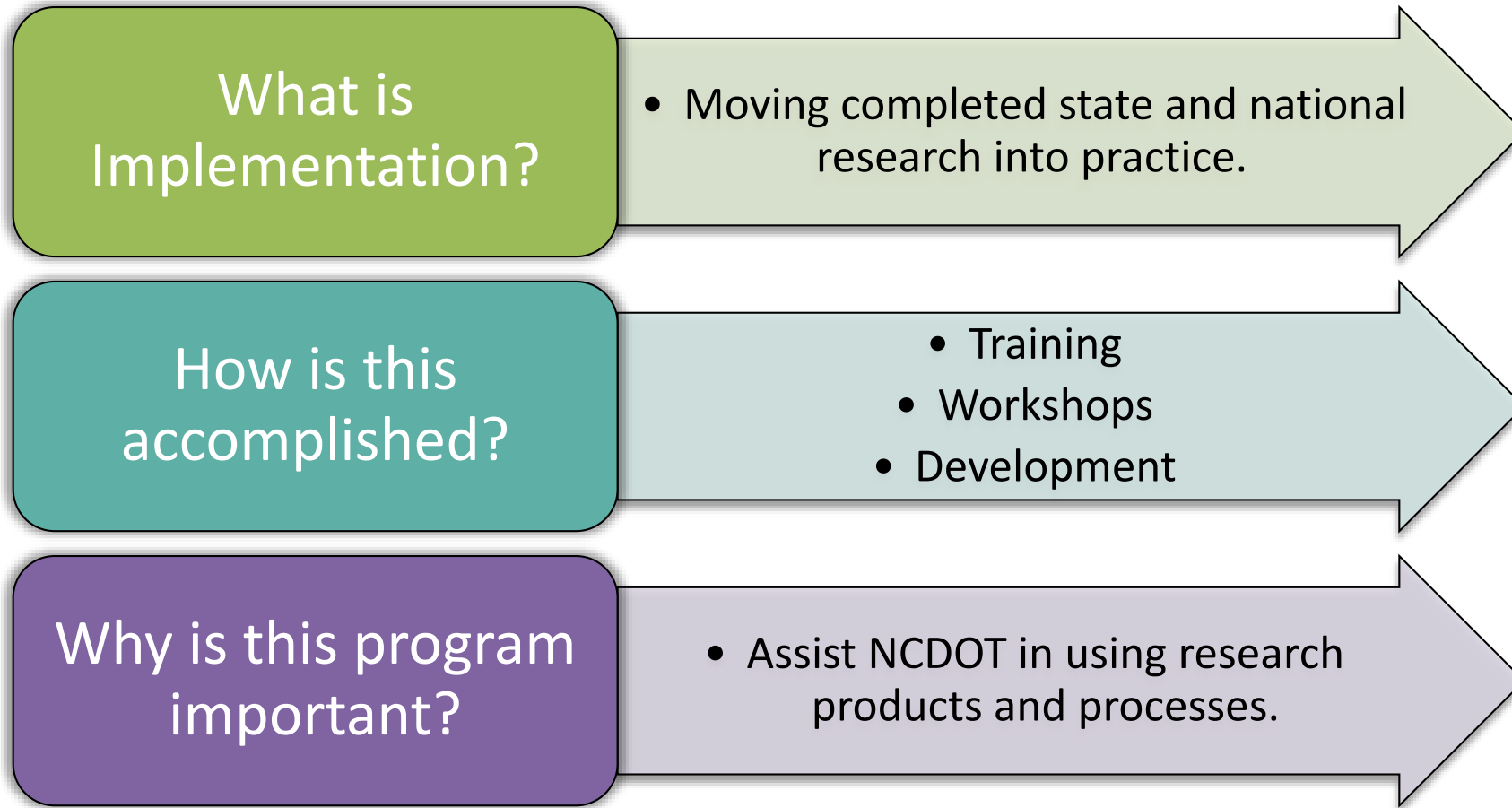
Technical Assistance and Implementation

Technical Assistance*



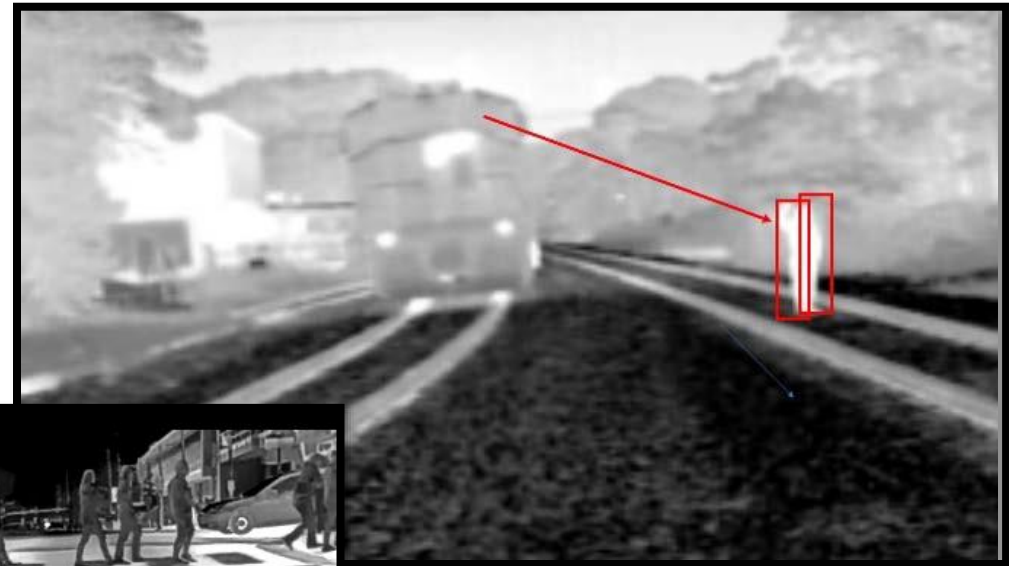
*Has been a great way to engage new researchers in a low-risk, low-cost scenario

Implementation and Technology Transfer (T²)



Implementation effort: RP 2019-50: “Pedestrian Incident Detection in the Rail ROW using Artificial Intelligence”

<https://connect.ncdot.gov/projects/research/Pages/ProjDetails.aspx?ProjectID=2019-50>



Annual Research & Innovation Summit

<https://connect.ncdot.gov/projects/research/Pages/ProjDetails.aspx?ProjectID=2019-46>



National Transportation Research Opportunities

National Initiatives



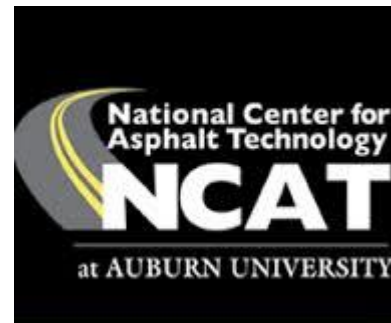
Long-Term Pavement
Performance Study



Research Advisory
Committee
Representative



Pooled Fund – NCDOT
Manager



National
Representative



Coordinator for NCHRP
Pooled Funds

Engagement Efforts and Resources

Research Office Works to:



Connect researchers and DOT technical experts



Hold meetings and roundtables at DOT locations to facilitate introductions and connections



Visit campuses and laboratories to meet researchers and gain an understanding of expertise and facilities



Establish long term relationships with talent

Thoughts on starting a new program:



Develop an organized way to gather ideas – could be a website, could be a simple PDF form via email



Identify key champions in the organization – who is genuinely interested in research and would actively participate?



Invite researchers for discussions with staff – this should include short presentations by the researchers on their work and interests



Start small – shorter, inexpensive projects that help everyone understand capabilities and what defines a successful outcome



Make it someone's job responsibility to organize, track and manage. If this isn't formalized, it will fall by the wayside quickly due to day to day fires

NCDOT Web Resources

<https://connect.ncdot.gov/projects/research/Pages/default.aspx>

Research Forms

Quarterly Newsletter

Current and Past Projects and Reports are Online

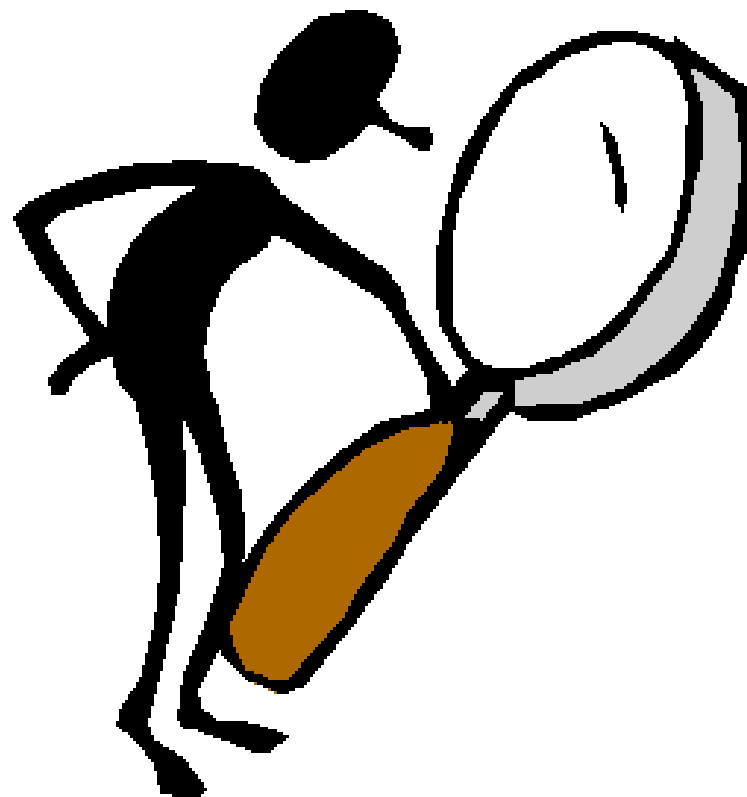
Easiest way to find us: Go to google and search for “NCDOT Research”

Contact Info

Neil Mastin	Research Manager	919-707-6661	jmastin@ncdot.gov
Lisa Penny	Mobility, Safety, Roadway Design, etc.	919-707-6663	lepenny@ncdot.gov
John Kirby	Stormwater, Environment, Planning	919-707-6662	jkirby@ncdot.gov
Mustan Kadibhai	Pavement, Materials, Maintenance, Structures, Construction, Geotech	919-707-6667	mkadibhai@ncdot.gov
Curtis Bradley	Implementation Manager, Planning, Policy, Multimodal	919-707-6664	cbradley8@ncdot.gov
Lamara Williams-Jones	Research Librarian	919-707-6665	lcwilliams2@ncdot.gov
General Contact	Research	919-707-6660	research@ncdot.gov

Research Connect Page (for Forms, completed and active projects and more):
<https://connect.ncdot.gov/projects/research/Pages/default.aspx>

Research Directory Page:
<https://apps.ncdot.gov/dot/directory/authenticated/UnitPage.aspx?id=8781>



Thank You