The North Central Regional Planning Commission (NCRPC) is an organization established under Kansas planning law, with membership comprising multiple city and county governments. In operation for over 50 years, the NCRPC has observed the transformative impact of emerging technologies—such as personal computers and the Internet—on rural community life and the delivery of local government services. As a result, the organization remains committed to exploring and adopting new tools that have the potential to enhance rural life.

One significant area of recent technological advancement is the increasing use of Unmanned Aerial Systems (UAS) and remote sensing technologies. While these tools are already commonly used by federal and state agencies, as well as in the private sector, their adoption by local governments remains limited. This is largely due to the technology's relative novelty and the specialized expertise required to operate it — challenges that are even more pronounced in rural areas. The issue, however, is not a lack of interest but a lack of access, opportunity, and supporting infrastructure. These barriers can be addressed under the right circumstances.

The goal of the NCRPC SMART Project was to introduce local governments to advanced information-gathering technologies—such as Geographic Information Systems (GIS), UAS drones, and remote sensing tools—and to demonstrate their practical application in managing and inspecting road and bridge networks. Bridges were selected as the primary demonstration focus, although the project acknowledged a broader range of potential uses. Four county-level transportation departments participated, with technical service providers added later.

The project consisted of four main components:

1. GIS Platform Development

This component focused on creating and managing a GIS platform capable of organizing, analyzing, and displaying geocoded data. The platform enables users to visualize spatial patterns and identify data relationships to support planning and decision-making.

This initiative fulfilled a longstanding NCRPC goal: to develop a data management system that provides member governments with valuable infrastructure insights. NCRPC tested two systems — Maptitude by Caliper and ArcGIS Pro by ESRI — and found both offered complementary but unique capabilities. The resulting system allowed the NCRPC to map transportation networks across the participating counties, including bridge locations, their conditions, and any required maintenance. A region-wide survey of all counties also occurred allowing the NCRPC to gauge the current use of GIS at the County and City level and also the interest in further implementation of this tool.

2. UAS Drone / Remote Sensing Introduction

This component sought to build local capacity for using UAS drones and remote sensing technologies in bridge inspections — aiming to reduce inspection costs and enhance safety by minimizing employee and traffic-related risks.

Each county involved had at least two staff members earn a Remote Pilot Certificate under the FAA's Small UAS Rule (Part 107), with training provided through Kansas State University. Equipment procurement occurred during the training phase but was delayed due to differing levels of county knowledge about UAS and remote sensing capabilities. Not all drones can accommodate the wide range of sensors under consideration, which further complicated the process.

Once all equipment was procured, winter weather delayed inspections. Despite this, each county provided data for five bridges — twenty bridges total — enabling finalization of the model algorithm.

3. Computer Modeling for Structural Evaluation

This component aimed to develop a computer model to help local officials analyze imagery and data gathered from bridge inspections, improving the detection of structural flaws — especially those that may go unnoticed through traditional inspection methods.

The Build America Center (BAC) at the University of Maryland was selected to provide technical assistance for model development. BAC also supported counties during data collection, offering guidance on optimal drone positioning and flight patterns to maximize data quality and detail.

4. Workforce Training and Tool Development

This final component focused on developing or enhancing training programs (e.g., drone pilot instruction) and support tools (e.g., pre-flight checklists, best practices for remote sensing). The emphasis was on creating user-friendly, practical resources tailored for local government use.

A key project takeaway is that while many training programs already exist — both on college campuses and online — what's often missing is field-based training. Hands-on experience in real-world environments allows users to learn both through supervised instruction and direct observation.

To address this, the project supported the expansion of UAS and remote sensing training beyond the classroom by providing access to the necessary technologies. This included the development of instructional videos showcasing best practices, along with guidance on the most appropriate technologies for specific applications — for instance, comparing thermal imaging to LiDAR for bridge inspections.