

Partnering for Innovation Briefing

January 2018

Our Capabilities

AECOM invests in developing underlying technologies and testing use-cases to help solve our clients' most complex challenges, resulting in a robust inventory of technological expertise



Data Capture & Analysis: **Big Data**

Organizations are increasingly tasked with gathering, managing and integrating massive amounts of Data. AECOM has extensive experience helping clients make sense of their data and leverage it to add value and drive efficiency



AECOM is helping clients, like the NJTA, to better understand their data and how they can leverage new technologies to make their processes and systems more intelligent



Immersive: **Visual & Immersive Technologies**

2D plans can be hard to interpret and don't convey the true impacts of big construction projects. Immersive technology (VR/AR) is being used on large infrastructure projects from high-speed rail to new highways and bridges



AECOM has helped clients leverage immersive technology to get stakeholders on board with major projects through our leading immersive studio team



Data Capture & Analysis: **Connected and Autonomous Vehicles**

Connected and Autonomous Vehicles (CAVs) are changing the way we think of transportation. AECOM is a trusted partner of DOTs and Transit Authorities, with expertise in developing ideas and piloting innovative projects



AECOM is helping clients like CDOT and MnDOT explore new technologies like automated buses and vehicle to infrastructure connectivity devices, enhancing their strategy for the future

Our Capabilities (Continued)

AECOM invests in developing underlying technologies and testing use-cases to help solve our clients' most complex challenges, resulting in a robust inventory of technological expertise



Data Capture & Analysis: **Physical & Cyber Security**

Critical infrastructure is continually under attack from physical and virtual threats. AECOM is adept at assessing vulnerabilities and leveraging the most cutting-edge technologies and concepts to protect clients' assets



AECOM has implemented fully integrated Situation Management Software, including mobile tools that allow for collaboration in the field via iPads and other devices



Digital Engineering: **Strategic Partnerships**

Collaboration across organizations can often be critical to addressing complex challenges. AECOM can facilitate strategic relationships with industry leaders in technology and data to help promote innovative solutions



AECOM is leveraging its relationships with leading technology companies like IBM to help clients gain access to industry leading expertise and capabilities like Machine Learning



Data Capture & Analysis: **Reality Capture / Unmanned Air Systems**

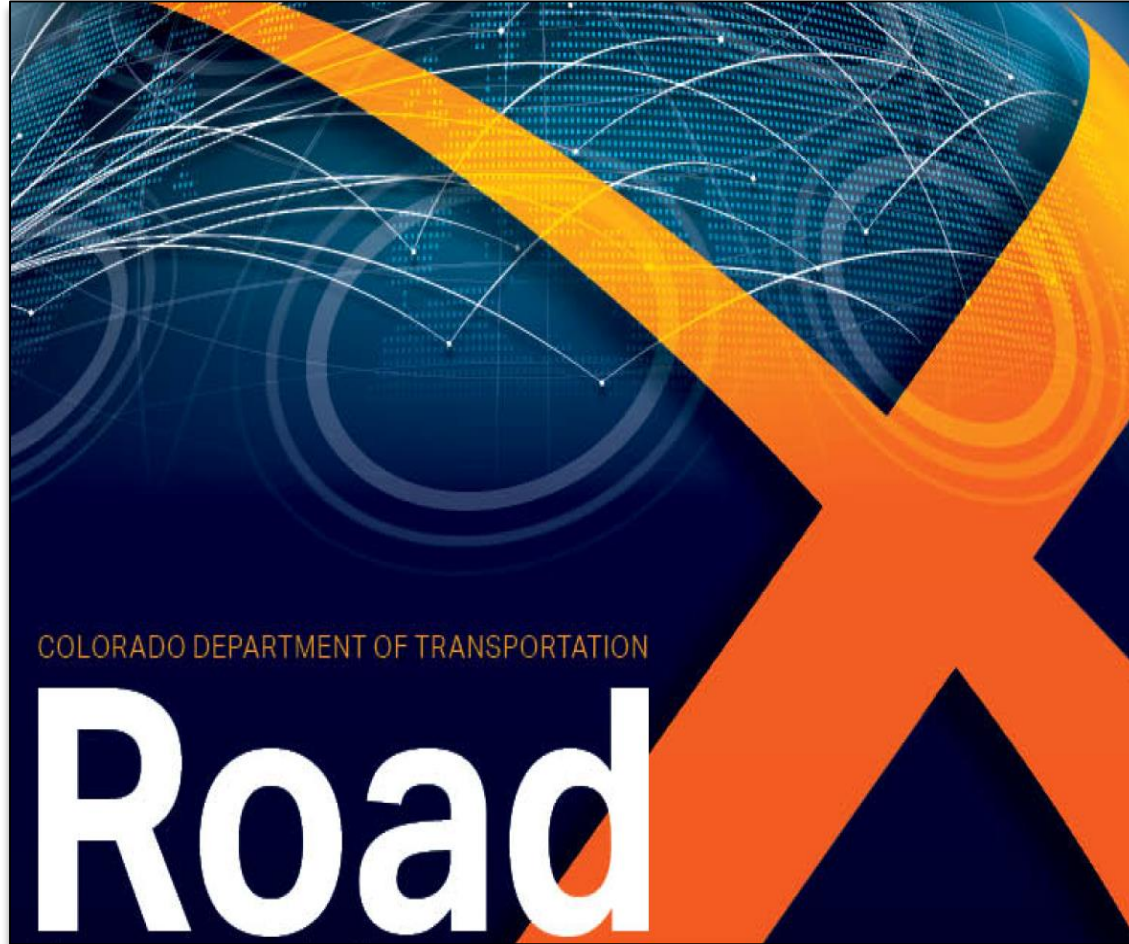
Advances in Photogrammetry and Machine Learning have opened the floodgates for innovative applications of reality capture. AECOM is leveraging these new technologies to manage physical assets across a variety of use-cases



AECOM is working with a DOT client and a major technology partner to collect roadside imagery and apply artificial intelligence to identify asset locations, types and condition

Partnering for Innovation: Innovation Programs

AECOM is working with agencies to implement innovation programs and source new, disruptive ideas that can add-value to their communities



RoadX Innovation Program — Colorado DOT

AECOM helped the Colorado DOT develop an Innovation Program (RoadX) that could harness technological innovations in order to create value for the community. To succeed, the AECOM team counselled that it was critical to establishing the right environment for innovation by garnering buy-in from executive leadership and establishing board governance and support. Equally important, agencies need to create a program and incentives that encourages the private sector to bring innovative ideas to them so they can be tested. Several ideas, including Smart Powered Lanes, have already moved into feasibility testing

Partnering for Innovation: **Incubating Technology**

AECOM has implemented an annual innovation challenge that aims to internally fund and incubate innovative technologies that we believe will benefit our clients and their communities



AECOM Ventures Global Challenge — AECOM

AECOM Ventures serves as the go-to innovation resource and partner for employees and business initiatives around the globe. The Ventures team provides an ideation platform, identifying those solutions with the highest potential, and shaping them for success in the marketplace. The annual AECOM Ventures Global Challenge is just one of many ways that the AECOM Ventures team helps to strategically accelerate ideas from concept to commercialization.

Partnering for Innovation: Intelligent Transportation Systems

AECOM has developed intelligent transit systems to address challenges such as dynamic tolling and on-schedule arrival



Integrated Dynamic Pricing Software — *Florida DOT and LA MTA*

AECOM has developed and integrated dynamic pricing software to maintain free flow travel speeds along express lane facilities, including:

- **A software algorithm** that dynamically adjusts toll rates, in 5–15 minute intervals, for customers using the express lanes
- **Performance reporting systems** to continually improve features and make it adaptable to regional express lane networks

New Jersey Turnpike ATMS Software — *NJTA*

AECOM worked with NJTA to develop a solution to manage traffic congestion and simplify daily operations, including:

- **A Strategic Partnership** with IBM Watson to give NJTA access to industry leading artificial intelligence capabilities
- **An Integrated Predictive Traffic Management Solution** that leverages NJTA's robust network of ITS devices

Partnering for Innovation: Autonomous Vehicles

AECOM is working with multiple DOT's to explore the impact of Autonomous Vehicles and prepare for the future



Autonomous Bus Pilot Program — *Minnesota DOT*

Among our many CAV projects, we are working with the Minnesota Department of Transportation on a pilot project to research requirements and solicit a vehicle partner for an autonomous bus that can safely operate in cold climates. Our CAV team is also assisting the New Zealand Ministry of Transport to assess its technical readiness for the deployment of level three and four CAVs

UK CAPRI Consortium — *Multiple Clients*

AECOM is leading a consortium that has secured more than £4.2 million of funding from Innovate UK and the CCAV to deliver an autonomous pod pilot project. The pilot project includes the design, development and testing of new autonomous and connected pods on-demand (PODs) in London.

Partnering for Innovation: Roads that Charge Vehicles

AECOM is working with partners to develop and test a new wireless charging technology that will leverage powered lanes to charge moving vehicles



Smart Powered Lanes — Colorado DOT

AECOM is leading a pilot project to implement wireless technology that will allow electric vehicles to charge while driving at full speed over a roadway. Building a network of smart power lanes can reduce electric range anxiety, improve the environment, create a new revenue stream and decrease overall fleet operating costs. This technology has been tested on a closed track and has been proven to transfer energy safely without impacting vehicle operations

Partnering for Innovation: Hyperloop

AECOM is a leader in Hyperloop infrastructure development, including the build out of Hyperloop One's test track in Nevada

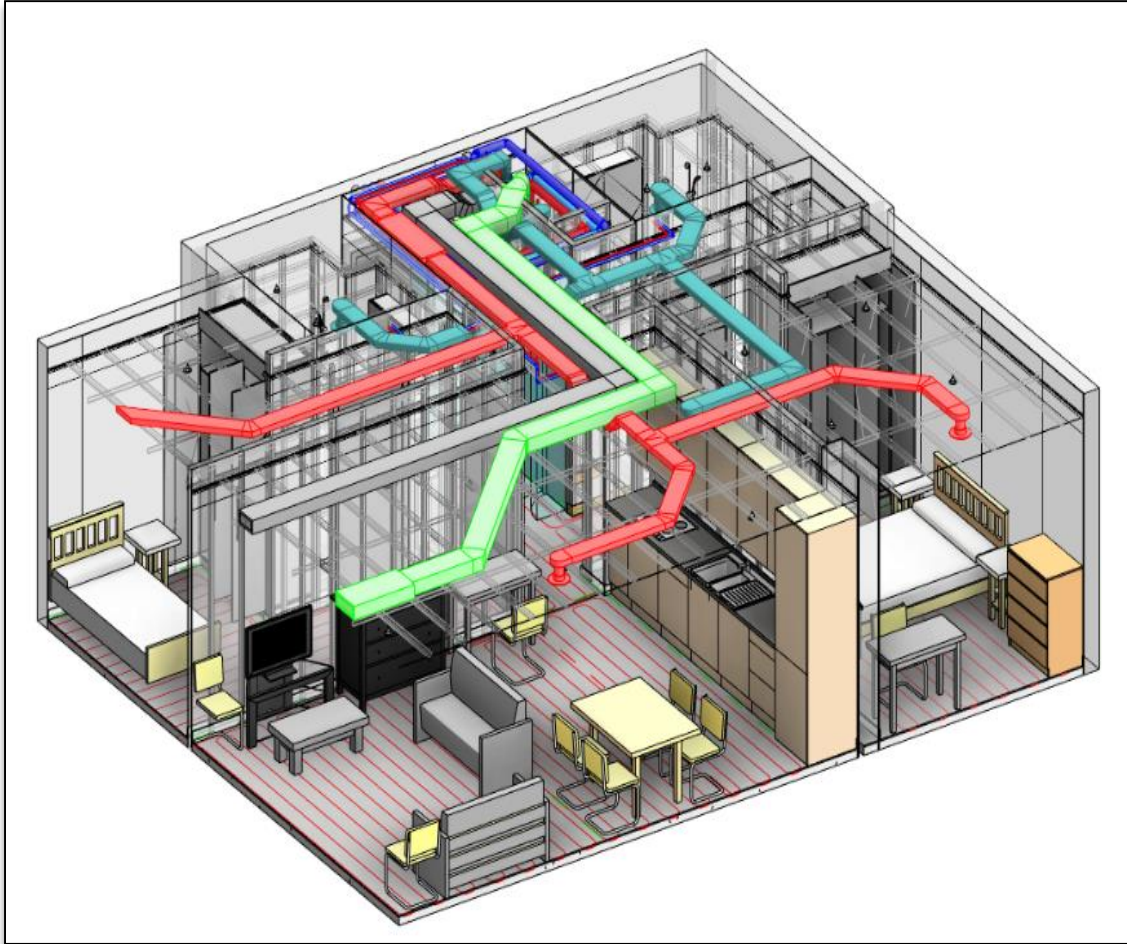


Hyperloop Feasibility Studies — *Multiple Clients*

AECOM is leading a study on how this new high-speed transportation technology could efficiently transport goods between the Ports of Los Angeles and Long Beach and their inland distribution centers, as well as how it can be used along Colorado's Front Range. Aside from the obvious mobility benefits, we anticipate this new high speed system can improve environmental air quality, alleviate congestion on roadways and increase port volumes over the next 20 years

Partnering for Innovation: Reimagining Building Design

AECOM is working to optimize the traditional building design process by re-using fabrication ready design components to speed up design, minimize re-work and enhance the construction process

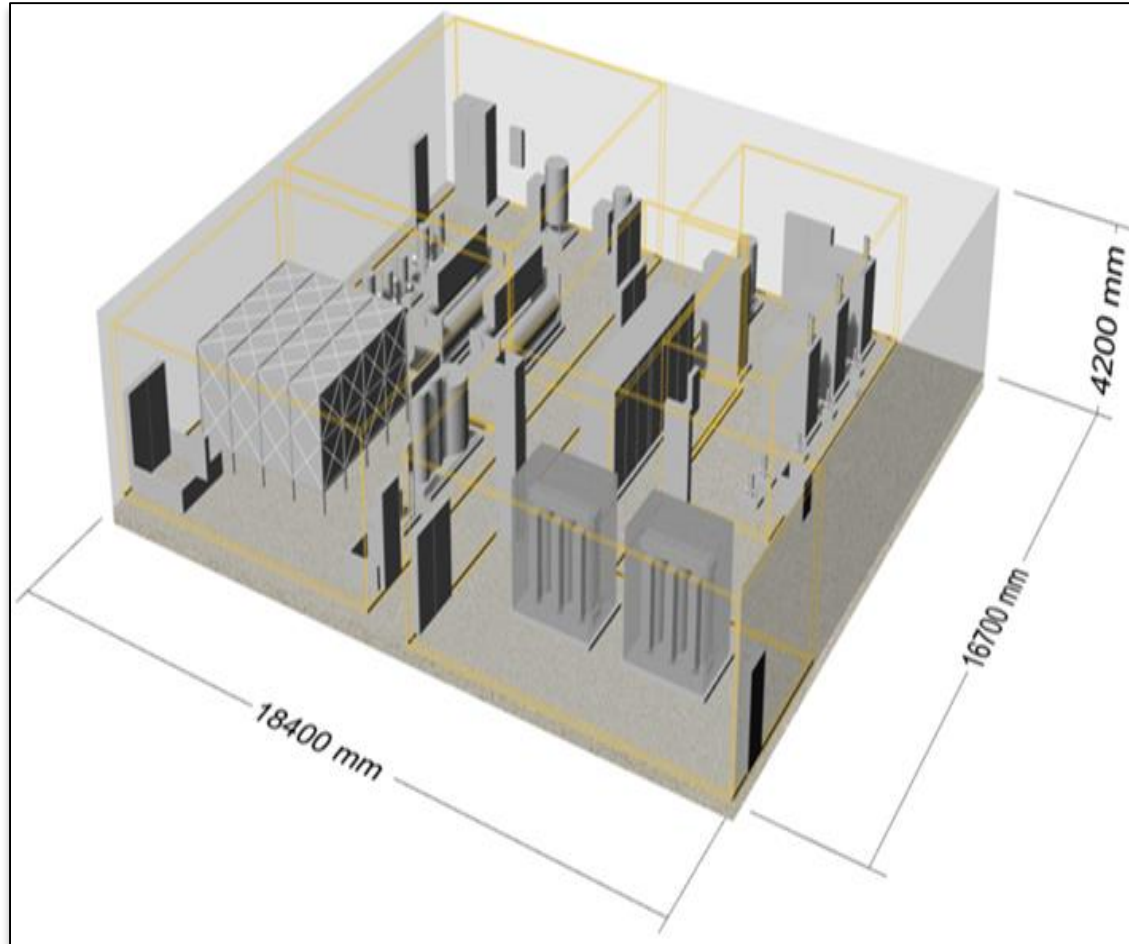


Design Component Library

AECOM developed a fabrication ready design component library for a major residential developer to use on residential buildings, avoiding the need to design components from scratch each time. This has allowed us to design a residential building using 20-30% less resources and time than is typically required for such a project. The construction process is also improved as standardized components enable a faster build, modular techniques and procurement savings.

Partnering for Innovation: Optimizing MEP Design

AECOM is developing an improved MEP design approach, bringing MEP in earlier in the design process and reducing detailed design time



MEP Design Improvements— *Multiple Clients*

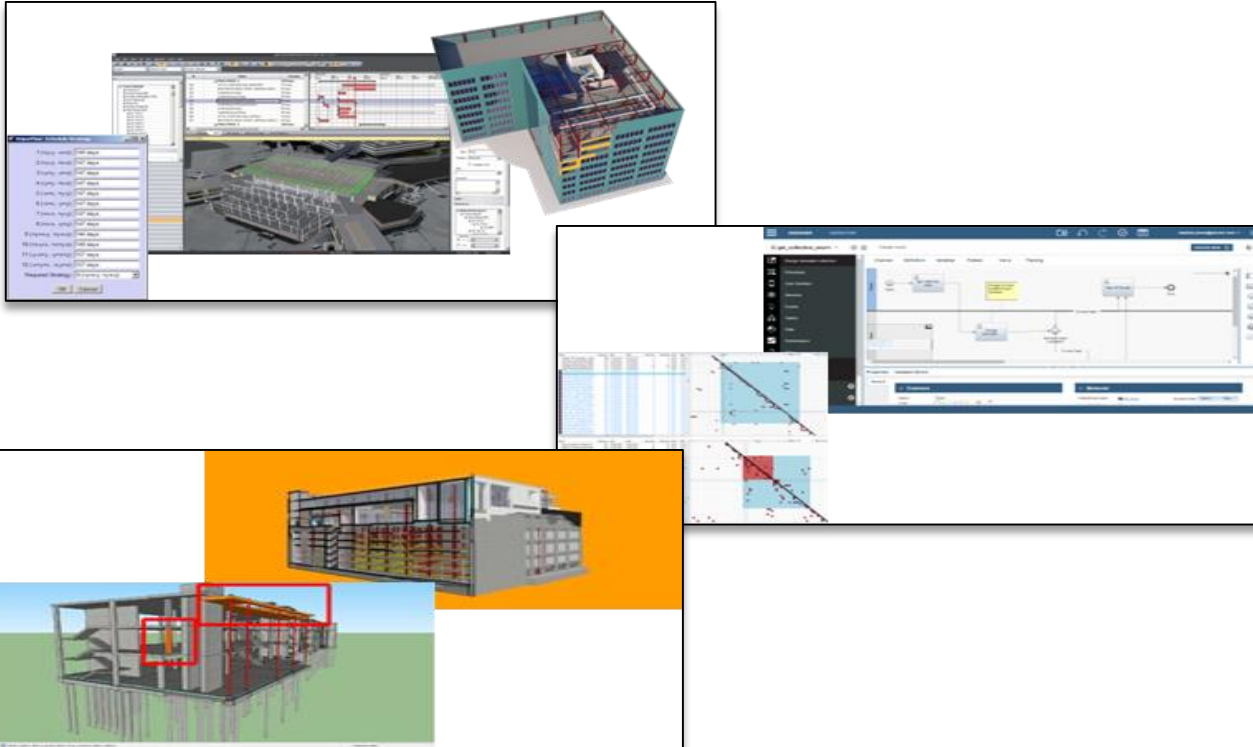
AECOM is developing standardized MEP content in addition to several automated MEP tools to improve:

- Drawing Production
- Plantroom Control
- Scheduling
- Load Calculation
- System Sizing & Layouts

These tools are expected to improve MEP design efficiency by ~10-15%

Partnering for Innovation: Construction & Design Optimization

AECOM is building tools to optimize the design and construction process, focusing on components like scheduling, process controls and design quality

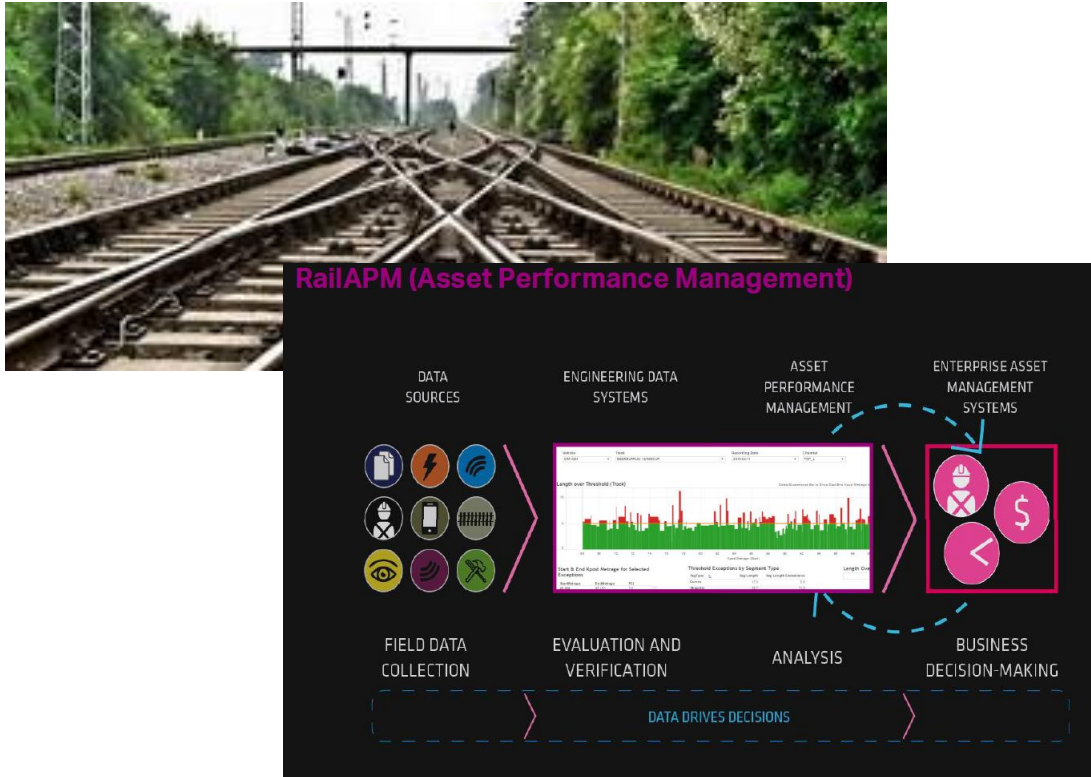


Construction & Design Optimization tools

Combining the use of digital models, multi-dimensional planning, powerful scenario analysis, and machine learning solutions, AECOM is pioneering new tools to optimise the design and construction process. We are developing solutions focussed on improving the quality of designs, design process controls and construction scheduling.

Partnering for Innovation: Asset management tools

AECOM is equipped with a combination of digital tools and engineering expertise to enhance asset management on critical infrastructure assets



Predictive failure analysis in Rail & Water

AECOM has developed tools to capture and analyze asset performance data to model the deterioration and failure of infrastructure assets.

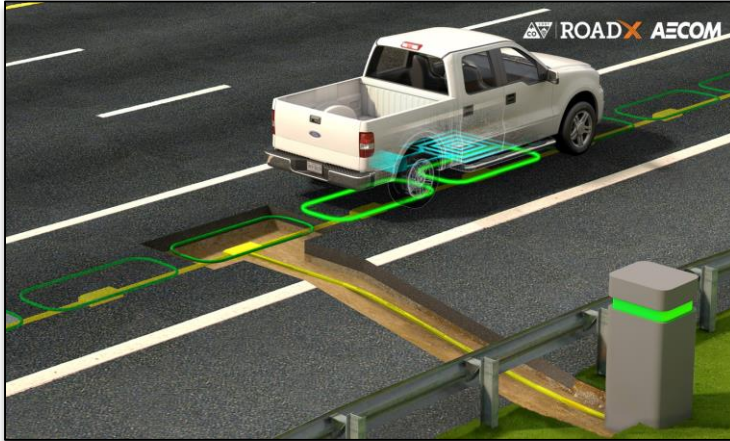
This allows the asset operator to better plan maintenance and renewal activities to avoid costly reactive maintenance and reduce operational downtime of their assets.

AECOM is using this approach with major rail network owners and several large Water Companies in the UK and ANZ.

Our Offerings

AECOM is a proven partner in navigating the complex challenges of the transportation technology market, helping clients to plan for the emergence and adoption of disruptive technologies

Innovation Strategy



Offering: Partner with clients to develop and implement an innovation strategy, focused on preparing for the emergence and adoption of disruptive technologies

Objective: Help clients prioritize their investment in new technologies by identifying the most effective and efficient solutions being developed in their respective markets

Project Snapshot:

- RoadX Innovation Program Management
- CAPRI

Feasibility Studies & Pilot Programs



Offering: Engage with clients on defining use cases, testing and evaluating technologies and/or sourcing strategic partners to conduct feasibility studies and pilot programs

Objective: Ensure that clients have all of the necessary information and testing required to make an informed and accurate decision when evaluating new technologies

Project Snapshot:

- Minnesota DOT Autonomous Bus Pilot Program
- CDOT Short Range Communication Receiver Pilot Program

Technology Solutions



Offering: Work with clients to enhance their existing technology portfolio by implementing innovative bespoke solutions that address their most complex challenges

Objective: Help clients address challenges by implementing innovative technology solutions that focus on limiting cost while maximizing operational effectiveness and asset lifespan

Project Snapshot:

- Florida DOT Dynamic Pricing Software
- NJ Turnpike ATMS Software