



Emerging Uses of Visualization



online



in-person

OVERVIEW:

From simple sketches and renderings to 3D images and animations, transportation agencies increasingly rely on visualization technologies to explain proposed projects to the public. As these tools become more affordable, visualization is playing a bigger role in public meetings and online engagement. Agencies may use virtual reality and augmented reality applications to enrich the conversation at open house meetings. Others use drones to capture aerial photography, allowing rapid, cost-effective development of imagery for use in presenting existing conditions and construction updates. Moreover, data visualization tools are helping agencies create infographics and animated illustrations that help the public understand complex transportation trends. With a wide range of potential applications for visualization, some agencies have developed in-house visualization capabilities, while others rely on contractors.

BEST SUITED FOR:

Project Development, All Phases

CASE STUDIES:

North Carolina Department of Transportation, I-440/Glenwood Avenue Interchange

The North Carolina Department of Transportation (NCDOT) uses a variety of visualization tools for highway projects across the state. Examples include virtual reality simulations, such as 360-degree panoramic images that users can view on their computers and smart phones, or at a public meeting. For the I-440/Glenwood Avenue Interchange, NCDOT showed the public 3D renderings of seven different design concepts at meetings and online and sought comments on participants' preferences. NCDOT publicized the meetings and project website using radio, TV, digital media, and geotargeting. With over 2,500 comments, NCDOT reached a larger audience and received more informed feedback than on typical past projects.



North Carolina DOT used smart screen monitors to display 3D visualizations of seven different design concepts for the I-440/Glenwood Avenue Interchange. Image courtesy of North Carolina Department of Transportation

Washington State Department of Transportation, Diverging Diamond Interchange

The Washington State Department of Transportation (WSDOT) uses visualization to promote focused conversations about infrastructure projects. The level of effort depends on the project and may range from a rendering to a fully produced video built from 3D model animations. One of WSDOT's most effective visualizations was a video on the Diverging Diamond Interchange (DDI) concept. The video used multiple visualization methods and



Washington State DOT produced an informational video using visualization to convey the benefits of a Diverging Diamond Interchange. Image courtesy of Washington State Department of Transportation



CASE STUDIES cont...

perspectives to tell a story about how this seemingly complex interchange would function and its safety and traffic benefits. With over one million views, the video helped lessen controversy and generated support for the DDI.

Connecticut Department of Transportation, Walk Bridge Program

The Connecticut Department of Transportation (CTDOT) used virtual reality (VR) to create an immersive experience for the Walk Bridge Program, which includes replacement of a major rail bridge and adjacent infrastructure projects. The VR simulation helps residents envision the final design—and scale—of this mammoth construction effort and its impact on downtown Norwalk. A VR headset is available for use at the program’s Welcome Center. CTDOT also uses the VR tool at community events and in educational outreach programs at local schools.



Connecticut DOT provides an immersive virtual reality experience at the Walk Bridge Program Welcome Center. Image courtesy of Connecticut Department of Transportation

Snapshot

Advantages

- Significantly increases public understanding of a project’s appearance and physical impacts compared to text or conventional engineering drawings
- Realistic and accurate 3D portrayals of design alternatives elicit interest and help viewers compare and comment on alternatives
- Virtual and augmented reality tools build on the public’s familiarity with gaming technology
- Can be easily shared in multiple ways: websites, social media, videos, print and during public meetings
- Helpful in communicating with limited English proficiency and limited literacy audiences

Disadvantages

- Requires lead time for development and can require specialized expertise
- Photo-realistic visualizations of initial concepts are sometimes misinterpreted as final designs
- Can be more costly to develop than traditional visual methods

Resources Required

- Requirements vary, but usually requires specialized expertise and hardware and access to visualization software

Outcomes

- Increased project understanding, resulting in more informed public input
- Accelerated project planning, design and delivery

Tips for Success

- Determine the public involvement objective for using visualization: for example, helping the public envision future conditions, alternatives, or a completed project design.
- Based on the objective and the time and budget available, select a visualization method with the help of an in-house expert or contractor.
- If feasible, aim to show design concepts from more than one perspective to enhance viewer understanding.
- Annotate visualization with a combination of text labels, color, icons and/or visual cues for improved understanding, usability and accessibility.
- When presenting visualizations, clearly spell out to viewers whether what they’re seeing is an initial concept, a series of alternatives, or a proposed final or near-final design.
- For web-based visualizations, provide text description of images for compliance with Section 508 of the Workforce Rehabilitation Act