

Improving efficiency in complex infrastructure projects

Jacobs

The Challenge

- Improve the accessibility of information for project teams

The Benefits

- Improved efficiency in complex projects
- More effective collaboration within teams
- Innovative use of GIS to solve clients' problems

Jacobs has developed a pioneering solution for making CAD designs and other BIM data accessible in a web-based, 3D GIS environment. Used by clients including Highways England, the solution provides a single point of access to all project information and allows multi-disciplinary teams to collaborate more efficiently during large, complex projects.

The Challenge

Jacobs is a global organisation delivering impactful solutions to some of the world's most critical problems for thriving cities, resilient environments, mission-critical outcomes and scientific discovery. Through a wide range of technical solutions and professional services, the company helps clients succeed by developing solutions to the real-world challenges they face every day.

Many of Jacobs' clients are tackling the toughest infrastructure and technology challenges, where large multi-disciplinary teams need to collaborate closely and share a vast amount of technical documentation in order to complete high quality projects, on schedule. The company identified that project data was often stored in different systems, making it harder for teams to find, view and interact with the data they need to enable them to work efficiently. For example, designs created in Computer-Aided Design (CAD) software packages couldn't be easily shared, as not everyone had access to the required specialist software or the skills to use it. So, Jacobs set out to develop a web-based solution that would combine CAD files, building information modelling (BIM) data and geospatial data to create a single, interactive and 3D viewer for all project information.

The Solution

Jacobs' Digital Solutions team already used Esri's ArcGIS platform to deliver a range of services to clients, so it decided to leverage Esri technology in designing the new solution. The team started by creating a streamlined workflow for transforming thousands of individual CAD files and Autodesk Revit files, stored in a BIM environment, into a format suitable for publishing in a 3D geographic information system (GIS) environment.

Then, using Esri's ArcGIS Pro and ArcGIS Enterprise, the Digital Solutions team created a 3D Viewer, allowing users to view CAD designs, BIM data and geospatial data all in one place. The solution brought together both 2D and 3D data files, allowing everything to be viewed side by side in a 3D environment for the first time. This web-based solution allows Jacobs' clients to create a single, interactive repository for all their project data, enabling employees to explore multiple layers of project information. Users can navigate easily around different components of a design, get a better understanding of the geographic context of the project, such as the line of sight, and even explore sub-surface features.

Highways England became the first of Jacobs' clients to use Jacobs' 3D Viewer to see data from junctions 3-5 of the M20. Use of this pioneering solution allows project teams to zoom in on maps of the project to see 3D designs of new gantries, road signs, stairways, carriageways, verges and underpasses. Users simply click on any feature, such as a section of underground pipe or gantry, to see detailed attribute data and can use embedded Esri tools to take measurements within the app.



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“By creating innovative technical solutions using ArcGIS we are helping clients improve efficiency in their projects and solve real world problems.”

Lorna Sherman, GIS Analyst, Jacobs



A view from the app showing the detailed design information and the ability to query it for BIM information.

The Benefits

Improved efficiency in complex projects

The ArcGIS-based 3D Viewer improves the efficiency of project teams by making all project data available to view and explore in one place. Employees don't waste time looking for information across multiple different software systems and can interact with CAD, BIM and GIS data at the same time, to gain a faster understanding of complex tasks.

More effective collaboration within teams

Critically, the 3D Viewer improves collaboration within teams, by making the same information available to everyone. Team members who are not CAD experts can now access CAD files in an interactive format that they can easily view and interrogate without the need for specialist CAD software and training. “In the rapidly evolving world of BIM, collaboration is key in keeping everyone on the same track and ensuring efficient, quality outputs,” says Liam Gallagher, Jacobs Director for Digital Delivery and Head of BIM, Smart Motorways Programme. “The development of this 3D viewer will change the way project teams interact with data and one another. This is part of the bigger picture that is BIM integration on projects.”

Innovative use of GIS to solve problems

The company has successfully leveraged the latest ArcGIS technology to create a web-based app with the potential to add value for clients right around the world. “The success of our 3D GIS solution puts us at the cutting edge of GIS development,” says Lorna Sherman, GIS Analyst at Jacobs. “By creating innovative technical solutions using ArcGIS we are helping clients improve efficiency in their projects and solve real world problems.”

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