



# BRINGING DESIGNS TO LIFE

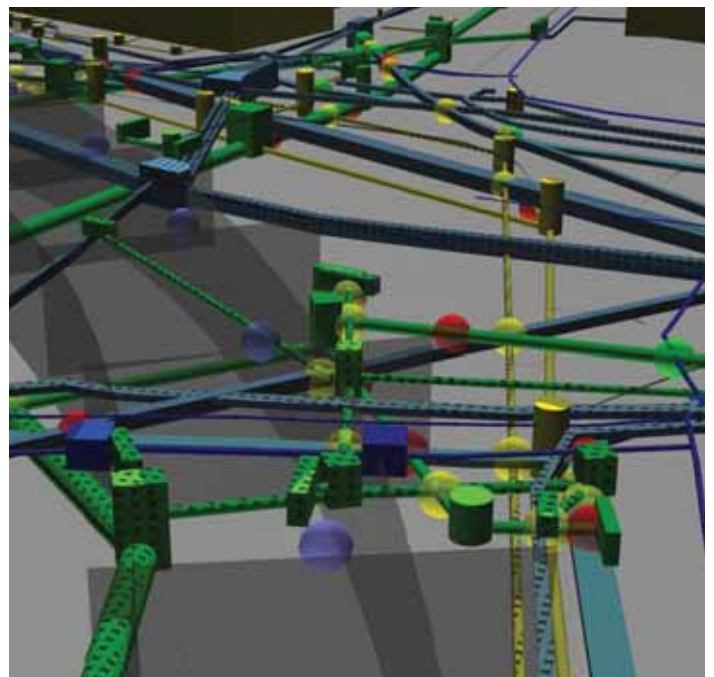
## NATAN ELSBERG EXPLAINS HOW RDV PUTS INFRASTRUCTURE PROJECTS ON THE RIGHT TRACK

Trying to steer a major engineering project through the design approval process is rather like entering the lion's den. A dozen or more experts will present their plans; landscape architects, sewage and drainage experts, traffic assessors and environmentalists, to name a few, will display their sketches, slides, maps and reports. Utilities providers must be involved because their cables, pipes and wires may have to be relocated, and ascertaining their exact positions is crucial. Local authorities also have their say, with one eye on potential votes and the other on business and similarly influential civic groups.

The committee juggles the documents, weighs the relative power of the interested parties, and then finds a way to mesh them into a coherent plan before giving the project the green light and praying for a minimum of pitfalls. For pitfalls there will be. How can the interests of one group not clash with those of at least one other interested party as the project progresses and unforeseen problems arise? Why shouldn't this happen considering that the various involved parties do not speak the same professional language; nor do they view the drawings and representations in the same way. And often, that's the crux of the problem: seeing all sides of the project before the first ground is broken and then following development as implementation progresses towards the final product. Sound familiar?

In Israel, several organisations found a novel way to address this issue. By using innovative, user-friendly software installed on AutoCAD platforms, the project managers created interactive three-dimensional visualizations that incorporated the agendas of all parties so that designs could be scrutinised from every conceivable angle.

**PICTURED ABOVE:** Greater Tel-Aviv's light rail passenger system is Israel's biggest-ever construction project'



The Israel National Roads Corporation, for example, was responsible for expanding a major interchange near Zichron Yaacov, a town just north of the center of the country. Another transport organisation, Mesilot, was expanding the new light rail system in Greater Tel-Aviv, and had to realign the utilities infrastructure running under several streets.

### Getting the full picture

National Road Corporation engineers faced the usual problems when presenting their plans to decision-makers. Ruth Lev-Ran, a senior planner in the Corporation, explains: "I always get the feeling that members of approval committees do not grasp the full picture. People without a background in engineering find it difficult to visualise the relation between different levels, bridge/road joins, etc."

The Zichron interchange project was held up when members of various committees could not agree whether a bridge or a tunnel would be the best solution. They were simply unable to visualise the safety and environmental implications of the two options. "It quickly became clear that we needed to create dynamic, interactive visualizations of both to expedite the decision-making processes," says Lev-Ran.

Mesilot project manager Pinchas Harari describes just one of the difficulties encountered in the light rail project and where realigning existing underground utilities involved an intricate maze of cabling and pipework laid over many years.

"We are talking about an extremely densely-populated and busy section in the center of Greater Tel-Aviv. A telephone cable passed through it, supporting 40,000 subscribers. In a case like this, we could not

disconnect and neutralise the area until a replacement network was completed."

For both Mesilot and the Israel National Road Corporation, two-dimensional drawings were insufficient to depict the projects and their needs. "Working with 2D drawings can sometimes be very confusing" says Harari. "Basically, you are given drawings of lines that are not always easy to comprehend."

Both organisations concluded that only 3D simulations could help them get their points across to the committees. There was another problem, too, in that records of existing infrastructure networks are sometimes incomplete ... a factor that can spring unwelcome surprises. "Despite this, one can be certain that all data entered in a 3D simulation are visible and meaningful," says Harari.

### Visualization is the key

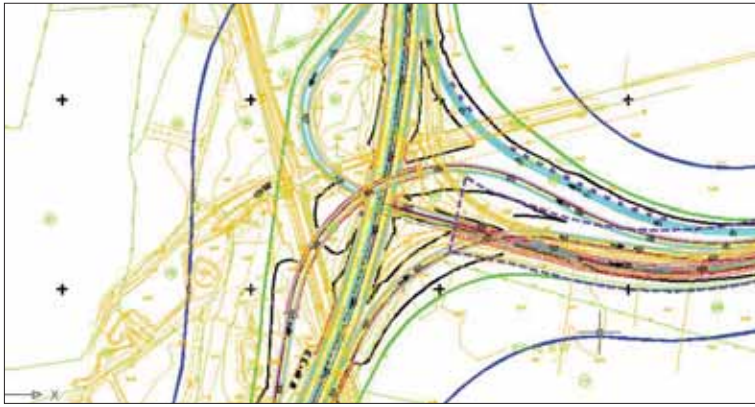
To overcome difficulties, both companies employed a new technology called Rapid Design Visualization or RDV from the Lod-based company of the same name.

While it is not unusual to conceptualize a completed project, RDV software allows it to be "seen" at every stage of development from any angle and explore it in virtual walk-throughs or drive-throughs. It also enables users to highlight certain elements and produce engineering drawings and textual reports of all data and findings.

A key benefit of RDV is its effectiveness in analysing on-site conditions in terms of proximity and collision detection. With the software, users can "see" exact distances and possible collision points that are almost impossible to detect without such simulation.

Expensive mistakes that are the bane of civil engineers are avoided. For example,

Reducing chronic congestion and parking problems on Tel-Aviv's crowded streets is a principal aim of the 22km light rail project. Being able to visualize the complex network of underground utility services from engineering drawings gives all parties a head start



RDVSystems

Thanks to RDV, visualizing road alignments and gradients is made easy for everyone involved in the Zichron interchange project, particularly where competing proposals are put forward for bridge and tunnel designs

visualization clearly shows the positions of storm and waste-water planning installations which are major factors in planning most civil engineering projects. In the case of the Mesilot light rail project, this was critical. RDV illustrated the clash points of the various networks as well as points where pipes are in close proximity to each other. In the case of Mesilot, they needed to see establish points at which one pipe was separated from another by less than 30 centimeters - an easily accomplished matter with the new technology.

Both Lev-Ran and Harari cite another invaluable benefit of RDV: it saves a lot of time, which translates into a lot of money. Rapid completion of a project also helps resolve associated problems which, in the case of those mentioned above, relate to traffic congestion and road safety. When an RDV visualization model was presented to the committee considering the Zichron Yaacov interchange proposal, a decision that had been held up for several years was taken within two hours!

### Easy integration

Based on Active-X technology, RDV is easily integrated into standard Microsoft applications such as PowerPoint or can even be used as a component of a custom developed application in Visual Basic or other programming environments. According to Lev-Ran of the National Road Corporation, using interactive visualization allows the involved participants to interact dynamically. The various parties can collaborate, without necessarily sitting together.

"Anyone interested in viewing potential road conditions while driving on a bridge or through an underpass can do so immediately. So can residents who want to see what the proposed flyover and/or underpass interchange will look like from their window. With RDV, we can comply with any request. The use of 3D simulation has numerous advantages, including the fact that the presentation is accessible to anyone on the Internet," says Lev-Ran.

### Day-to-day use

By seamlessly incorporating RDV into AutoCAD environments, typical users can integrate an interactive 3D environment into their standard design workflow. "Beyond our original purpose for using this new software to help communicate complex design projects to non-professionals and cut down approval time frames - rapid design visualization has proved to be a useful design review and analysis tool on a daily basis," says Michael Hekter, GIS manager for the Tel Aviv light rail project.

He notes that 3D programs provided by CAD companies often employ technologies and paradigms that call on visualisation experts to produce the final product. "Rapid design visualization enables us to create and visualise projects immediately, using our design and drafting software. It has revolutionised every phase of our work, from preliminary design validation through to presentations for public review, and even on-site to visualise complex construction scenarios."

Hekter adds that RDV also overcomes the limitations of other visualization solutions. "For example, one produced static pictures and another made use of very large animation files, neither of which was very helpful for communicating with our intended audience. Because they were not interactive, we were limited in our ability to determine what would be seen in the simulation."

### The lion has been tamed

Thanks to RDV, the approval process for engineering projects has been streamlined. The process of creating and updating simulations has been brought into each company's computers so that work progress can be reviewed at any time. The lion in the den has been tamed.

## FROM LOCAL TO GLOBAL

Following success in Israel, North America and several European countries, RDV Systems (a DataSafe Group subsidiary) is making its software available to designers, engineers, architects and GIS professionals worldwide. The product is available in versions to suit various professional needs: RDV for Civil 3D, RDV for Map 3D, RDV for Land Desktop, RDV for Architectural Desktop, RDV for Building Systems and RDV Generic AutoCAD. More information, including demos and trial downloads, can be accessed at [www.rdvsystems.com](http://www.rdvsystems.com)