The Urban Simulation Team at UCLA is a research group developing applications for real-time visual simulation in design, urban planning, emergency response, and education.

The Team’s primary focus is to build a virtual model of the entire Los Angeles basin which can then be used to interactively fly, drive or walk-through the city. (Real-time technology differs from animation, which uses a sequence of pre-determined and pre-rendered images to create the illusion of movement. In real-time technology, the user interacts with the modeled environment at will, controlling movement direction and speed with the mouse or keyboard commands.)

The Virtual Los Angeles model already includes major sections of the city including downtown, the Pico Union district, the Miracle Mile and Mid-Wilshire portions of Wilshire Boulevard, Los Angeles International Airport (LAX), Westwood, UCLA, Hollywood, MacArthur Park, Playa Vista, and portions of South Central and Santa Monica. Negotiations are currently underway for other areas.

The Team has developed an extremely efficient system that can be used for visualizing any urban environment. This efficiency begins with the time and labor to construct a model and includes the computer resources required to interactively render such large models. The model is constructed by combining aerial photographs with street level imagery and three-dimensional geometry to create a realistic visual simulation of the dense Los Angeles urban environment, detailed enough for the graffiti on the walls and signs in the windows to be legible.

This approach has proven to be a useful tool for architectural design development and city planning because it is possible to evaluate alternatives more rapidly and in more detail than through traditional methods of analysis. Results of the planning/design process are illustrated visually, allowing the client or community to view a proposed environment in a realistic fashion and become informed participants in the decision-making process.

The strength of the simulation system is the elimination of complex blueprints, charts, and other hard-to-understand traditional representational methods. Instead, viewers can easily ‘place’ themselves within a digitally accurate perspective representation of a proposed development and better assess the project’s impact.

The Team has worked extensively with the Los Angeles City Council’s Chief Legislative Analyst and Mayor Riordan’s Office of Economic Development on projects across Los Angeles. Other principal clients include UCLA Capital Programs, Los Angeles World Airports, the Metropolitan Transit Authority, the J. Paul Getty Trust, and the Israel Antiquities Authority. Past projects include work by such noted architects as I.M. Pei, Richard Meier, Charles Moore, Robert Venturi, and Robert Stern.

The Virtual Los Angeles model also provides the environment for the Team’s continued explorations into diverse applications for real-time virtual reality models of urban environments including emergency response and community governance. One compelling application is to use the model as a graphic reference to information via the World Wide Web. This approach allows the association of a rich (and virtually infinite) assemblage of information with the three-dimensional graphic entities located within the visual database.

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The Los Angeles Arena Land Company, owners of the Staples Center in downtown Los Angeles, used the Urban Simulation Team to visualize their plans for the L.A. Sports and Entertainment District. The proposed District is to be built adjacent to the Staples Center in downtown Los Angeles, and is slated to include a 1,200-room convention "headquarters" hotel, entertainment, retail, restaurant and office space, parking, and an outdoor plaza in its first phase.

The developers approached the Team based on the recommendation of Ron Deaton, the Los Angeles City Council’s Chief Legislative Analyst.

In May 2000, Timothy J. Leiweke, president of the L.A. Arena Land Co. and STAPLES Center, unveiled plans for the development to the City Council by showing a video walk-through of the real-time model on a large-screen projection system.

By situating the proposed development in the context of downtown, the model allowed for both broad discussion of urban planning issues and specific design questions such as the District’s impact on the Figueroa corridor. The response was positive though public funds have yet to be committed to the development.

UCLA Capital Programs requires that all new construction at UCLA be analyzed in the context of the Urban Simulation Team’s real-time model of the campus. For the new Physics/Astronomy Building, the Team worked closely with the Los Angeles office of Anshen + Allen during design development and ultimately modeled five versions of the proposed building.

When the first design (left) was shown to the campus architects and administrative vice-chancellor, the feedback was that the building was too massive and so the architects were charged with producing a more subtle scheme. Subsequent designs were shown to interested stakeholders and members of the faculty in group meetings in an auditorium with a large screen projection system. The additional feedback developed in these meetings were provided to the architects.

Throughout the process, changes were modeled and analyzed. One of the design challenges was to create a dominant entryway to the building that also provides a termination to the axis between Powell Library and Kinsey Hall; a review of the design iterations illustrates the development of this area. The materials were also modified to better match the palette suggested by Powell Library and the adjacent Moore Hall. Construction on the project has just begun. The final design is shown at right below.
In 1998, the Los Angeles World Airports commissioned a multi-disciplinary team led by Ted Tokio Tanaka Architects to explore beautification opportunities at Los Angeles International Airport (LAX).

The project was constructed in two phases. To record the existing condition of the airport, the team first built a model of the Central Terminal Area (CTA) including the terminal buildings, parking structures, roadways, operations facilities, and signage components. The second phase of the project was to model the beautification team’s proposed changes. Architecturally, the changes included a canopy to unify the primary elevations of the terminal buildings, sheathing for the bridges between the terminals and the parking structures, and cladding for the underside of the elevated roadway. New landscaping was introduced throughout the airport; the model focused on the changes to the primary airport entrance and in the open areas surrounding the Theme building. Opportunities for public art programming were also highlighted.

The model was used to present the beautification team’s ideas to the Los Angeles World Airport’s Board of Commissioners and at public meetings held throughout the process. Future long-range airport planning and development efforts will also be able to use the model to explore expansion alternatives as LAX grows to keep pace with the demands of the next century.

The Miracle Mile section of Wilshire Boulevard was recently added to the Virtual L.A. model as part of a Bus Rapid Transit Study for Martha Welborne’s Surface Transit Project.

After modeling the existing street context using accurate street coordinates supplied by the City of Los Angeles, the Team constructed alternative road configurations to analyze the impact of a dedicated rapid transit bus right-of-way. Traffic patterns in the different road configurations reflected projected density. The majority of vehicles were constructed specifically for the project while landscape elements and street culture were pulled from the Urban Simulation Team’s proprietary libraries. A special bi-articulated high-capacity bus was created for the project based on those in Curitiba, Brazil.

The Team modeled the existing situation and three different alignment alternatives. Footage from a real-time fly-through of the model was then captured and edited into a video illustrating the project. This video was presented to the Metropolitan Transit Authority (MTA) Board and the favored design was immediately selected. (At that same meeting, a different project group presented four other proposed alignment changes; the Board postponed those decisions, saying that they did not have sufficient information.) The MTA is currently preparing an environmental impact report on the new Wilshire Boulevard alignment.
In 1997, the Urban Simulation Team was contracted by Mayor Richard Riordan’s Office of Economic Development to build a model of the Hollywood Entertainment District, an 18-block stretch of Hollywood Boulevard. The model was intended as an inter-agency communication tool to help guide the redevelopment of this area of the city.

Because of Hollywood’s central role in Los Angeles, there are a number of civic and neighborhood entities that are stakeholders in its revitalization, including the Community Redevelopment Agency’s Hollywood Redevelopment Project, the Hollywood Entertainment District Property Owners Association, the office of Councilmember Jackie Goldberg, the MTA, and the Hollywood Chamber of Commerce.

The model has been used to evaluate a number of projects including an analysis of different street tree strategies for Hollywood Boulevard. A potential redevelopment of the Galaxy Theatre complex was also modeled for review by the various stakeholders involved in the project.

Every storefront in the project area is also linked to its own unique web site, allowing the model to act as a three-dimensional database to information about the businesses in the area. This kind of connection between the simulation and merchandising activity in the real world creates interesting possibilities for web-based on-line shopping in geographically distinct areas of the city.

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When UCLA began planning for a new Orthopaedic Hospital in Santa Monica, the Urban Simulation Team was commissioned to build a model of the project area and the surrounding neighborhood for use in design development and community outreach.

A video walk-through of the model was used at public forums to present the design to the community. This strategy proved very effective. In a Sunday, June 27, 1999 L.A. Times article about the hospital plans, the Santa Monica project team was commended for its commitment to working with the neighborhood and sharing their plans in an open process that included exploration of the project through the Urban Simulation Team model:

“Representatives from neighborhood organizations who had previously been opposed to nearby Saint John’s Health Center’s $270 million renovation plan, appeared to be somewhat pleased by Santa Monica-UCLA’s plan.

“The Santa Monica Hospital has been very different than St. John’s,” said David Cole, president of Mid-City Neighbors. “They’ve involved neighborhood groups and have used some of our input. They’ve been sensitive to the fact that this is [a] small community.”