



Join together

As intelligent transport systems advance and begin to accommodate multiple modes, the tools used to simulate their impacts and efficacies must also evolve. *Intertraffic World* meets one expert who is ensuring his company's software is up to the task of modelling corridors, urban landscapes and even whole cities

Words | **Michael Smith**

When Dr Alex Gerodimos joined transportation simulation software company TSS-Transport Simulation Systems in 2007, he didn't imagine he'd still be with the company now. This is not to say he didn't have faith in the company's long-term future; instead it's more of a reflection of how Gerodimos felt about traffic modelling based on what he knew then. As he reflects on it today, his stance changed somewhat: "I have stayed at least twice as long as I thought I would and I see no signs of changing my mind yet," Gerodimos comments.

Part of what's held his interest for the past seven years are the advances in the transportation modelling world, which appeal to the 'geek' in Gerodimos. He says: "I started on this journey as an undergraduate mathematics student, and continued with post-graduate studies in the UK in operational research – more specifically, in combinatorial optimisation. In simple terms, this involves making the most out of scarce resources using algorithms, almost invariably implemented as software." Operational research has numerous applications in transportation: one of them is yield management and dynamic pricing of airline seats, hotel rooms and air cargo space, which is where Gerodimos started his career.

Following a stint at London-based pedestrian modelling software company Legion as CTO, Gerodimos joined TSS at its Barcelona headquarters in a business development role. In his initial years with the company, Gerodimos and the rest of the team concentrated on articulating exactly how what they were doing was different and, for many users, better. The company was going from strength to strength, growing to 26 people in 2013 from only 17 in 2007 but the close-knit team in Barcelona had bigger plans.

Gerodimos reveals: "My arrival coincided with the realisation that although it's usual to have distributors around the world as it's not practical to open small offices in lots of places, in certain markets it was insufficient for us to rely on a company whose primary focus was not our software. But a subsidiary, on the other hand, could pursue the development of a market with an attention to detail that makes all the difference."

This is why, when we speak for our interview, Gerodimos is sitting in his office in New York, where he's now president of TSS-Transport Simulation Systems, Inc since moving there to create the subsidiary three years ago. Later on he'll be Skyping another colleague, Alex Torday, who also moved from Barcelona to form another subsidiary; this one in Sydney, Australia.

Of course all of the initiative and drive in the world wouldn't be enough to succeed if the products themselves weren't high quality. Gerodimos believes that what TSS offers is "a unique fusion of all modelling levels." He details: "For many years we have challenged the notion

that users will have to buy and use three or four separate products to accomplish what should be a single task." This relentless pursuit of an integrated approach has served TSS well and its flagship product, Aimsun, is now in its eighth generation, incorporating previously segregated tools for demand modelling and various levels of traffic simulation. A newer tool for real-time decision support based on simulation, called Aimsun Online, is also making headlines in the ITS world.

Who uses the software?

One of the most high-profile projects to use Aimsun Online is the Interstate 15 Integrated Corridor Management (ICM) system demonstrator in San Diego, California. Gerodimos outlines the project: "It's not a one-off initiative but rather the first fruit of a national initiative the FHWA embarked upon several years ago. Since the beginning they have identified promising sites and performed analysis and modelling of the potential benefits of implementing ICM. They decided on two demonstrators, one of which is our project in San Diego.

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Alex Gerodimos

"ICM refers to unifying what previously had been different administrative and decision-making entities and consolidating the process of taking decisions about mitigating congestion and managing traffic. One example is Interstate 15 in San Diego. The local DOT, Caltrans, is responsible for all aspects of its operation. However this is not an isolated network – it's integrated into several cities and their networks' arterials, so if operators implement a change on a highway it can affect traffic downstream on arterials. Coordination has the potential to smooth out problems that may arise, and brings all the benefits of improving the flow of traffic so it's possible to achieve travel-time reduction and reliability, a lower rate of accidents, etc."

Gerodimos also points out that some forms of ICM even go as far as to integrate other modes of transport, which increases opportunities for collaboration and ultimately offers even greater benefits to the end users. The San Diego demonstrator is built in this mould and TSS, in collaboration with Delcan, is responsible for the decision support system based on real-time simulation. Gerodimos comments: "I cannot

overstate how happy we are with how San Diego has gone. It is definitely the most challenging project we have ever taken on."

The project's scale poses obvious demands but as Gerodimos reveals, it's the 'real-time' element that's truly difficult.

"When you're working in real time, your model and its results are totally exposed. When doing operations planning and modelling, it's not usually a live model that everybody can open, check and play with in different ways. Usually a model is just shown as a PowerPoint presentation. People are studying it but it cannot be rigorously interrogated in the same way as a live model that everyone can log onto and check."

He adds, "That's one factor; the other is performance. In traditional modelling you can take your sweet time. If you're creating a strategic plan for the next 10 years then you can take 48 hours or so for your modelling. But in real-time modelling, if you take any more than five or six minutes on a simulation for the next half an hour, then you might as well sit there and wait for things to unfold and watch them on CCTV!"

For the ICM demonstrator, although TSS customised its Aimsun-based software and the Aimsun Online product that's used in the real-time decision support system, Gerodimos is keen to stress that the challenges were solved by what is effectively off-the-shelf software. "We are taking a standardised piece of software and building something that is adaptable to many situations. We are not keen on creating a set of bespoke installations, because they become harder to support and that is no good for our clients or for us."

He reveals, "We are at the final acceptance testing stage of the software. The system is live, it takes feeds from the field in real time, analyses data and performs extremely well in terms of computation time and quality of the results."

Wider scale of modelling

As well as projects such as ICM, the key trend Gerodimos has noticed – and that TSS has responded to – is the rise of city-wide or network-wide modelling. This has historically been difficult – if outright impossible – both due to constraints in

TEAM TSS TAKES NEW YORK

Gerodimos explains that when TSS-Transport Simulation Systems, Inc was formed, the idea was to build "a small but expert" team. Indeed, today he works alongside just two others. Gerodimos says: "The first is Matthew Juckes, who has a long background

in modelling. He's our project manager for the San Diego ICM project and he's been doing an excellent job on that. The other expert is Murat Ayçin. He has a PhD in transportation and has used every tool there is to model Canal Street in Lower Manhattan! He was the

first person to introduce Aimsun to New York City in his previous capacity working for another consultancy. The first Aimsun model they built was for the Broadway pedestrianisation model. This has resulted in very liveable environment where we are."



Screenshots from the San Diego ICM demonstrator, which uses Aimsun Online for real-time simulation



modelling software itself (particularly costs associated with run time) and in the plain fact that network-wide data was rarely available. But data coverage has come on in leaps and bounds in recent years. "We're still not able to have the data we modellers would love – which would be everything, everywhere, every second! But we're getting much closer in many places to having enough data over enough locations over a long enough of a period of time to be able start building these models that encompass an entire city or corridor," says the 44-year-old.

Like the 'I' component of ICM, this trend for all things integrated is part of the broader traffic management picture. And it's

an area that Gerodimos feels the USA has been slower than Europe to pick up on. He observes: "Transport for London is a prime example. To someone like me who has been a London citizen, it makes perfect sense to be able to use my Oyster card in lots of different locations, then leave the Oyster system and go onto a bike, all in one journey. People are realising the future of mobility is not mode specific; it's definitely multimodal."

"To continue along the lines of functional silos and have authorities that only manage the buses, the subways or a particular aspect of a particular type of road will make less and less sense. As citizens we're not interested in any of that; we're just interested in getting smoothly to our destination – everything else has to follow suit."

Gerodimos cites New York as an example of a city that's acting upon this realisation. "New York has seen a major increase in bicycle riding and ferry riding. And of course it has always had an astoundingly complex rail network bringing people in, and a subway system that carries an impressive number of passengers. Now we have shared bicycles, a cycle lane network, buses are everywhere. New York is a great example of city that doesn't pretend people all want to drive from A to B. I do these multimodal trips every day; this is not a 'blue sky' example. The type of journeys that plenty of people are making every day is precisely what we need to manage and model." ■



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