EU-funded researchers have created an integrated system of tools that can solve packing problems in a matter of minutes. Some of Europe's top research institutions were involved in the three-year Net-WMS project, which has developed methods to optimise computerised packing procedures that are already saving companies time, money and space. Net-WMS ('Towards integrating virtual reality and optimisation techniques in a new generation of networked businesses in warehouse management systems under constraints') received EUR 2.32 million of funding under the Sixth Framework Programme (FP6).

Everyone knows the headache of packing. Things won’t fit properly, unusual shapes stick out, and you end up removing everything and starting again. For companies, packing can be a serious problem, swallowing up time, money and staff.

But traditional packing problems may soon be a thing of the past for companies and warehouses thanks to the Net-WMS project that has taken the problem, applied mathematics, computer systems and modern logistics and arrived at a solution to make packing a breeze. The new system is already on the market and proving effective in finding solutions to packing problems for a wide range of companies.

'We decided to focus our attention in the area of spatial optimisation because there
was an obvious commercial opportunity,' explained the project's scientific coordinator Dr François Fages of INRIA (Institut National de Récherche en Informatique et Automatique) in France. 'Many firms cannot afford expensive software, but even small improvements in the way they pack shipping pallets or use warehouse space, for example, can make an enormous difference to their profitability and competitiveness.'

The team produced a set of groundbreaking algorithms that use a 'constraint programming approach'. The first step of this entails considering all the constraints of a particular packing job and the possible solutions to it. This makes the 'pruning' of the search space, step two, much swifter.

'The algorithms developed in the project are quite unique,' said Dr Fage. 'We've really broken ground with this project. Our scientific results have been published in eight peer-reviewed scientific journals and presented at several international conferences.'

Novel methods created by Net-WMS include a way of eliminating time-wasting 'dead end' solutions and the development of a whole computer language to describe packing constraints such as the maximum weight for a container or the stability levels of a pallet.

The different modules of the Net-WMS system, which include the spatial algorithms, a rule programme and a virtual reality model, are interconnected to create an all-encompassing software system that can model, simulate and optimise the entire packing process.

A French company established to exploit the potential of Net-WMS has already used the system and good results have been achieved, with packing solutions reportedly improved by between 5% and 15%. Even using one or two fewer pallets or boxes a day can add up to substantial savings for a business over the course of a year.

'In most warehouses today you don't know until you've finished packing exactly how many pallets you are going to ship,' a source close to the project was quoted as saying. 'That means you can't confirm with the transport company the size of vehicle they need to send until the very last moment.

Businesses involved in the project included KLS Optim and Peugeot Citroen Automobiles (PSA), based in France, as well as Fiat (Italy). PSA and Fiat are to be involved in a follow up project that will look at further refinements to the work carried out by Net-WMS.

Countries