CGTech’s John Reed is keen to stress that Vericut offers CNC program verification, not merely toolpath verification/simulation. That’s because Vericut simulates the entire CNC machining process. CAM systems, he says, have toolpath simulation but not complete process simulation. And that’s not all.

“CAM systems simulate the path created in the CAM system before it is post-processed into a CNC code – Vericut simulates the CNC program after post-processing,” he explains. “In addition, the CAM system does not have a full kinematic model of the machine tools and does not simulate tool changes, indexing moves and other non-cutting actions that can cause machine tool collisions.”

So who needs this type of package? “A number of types of user can benefit from using Vericut,” says Mr Reed. “Users of complex machine tools, for example, 5-axis milling or mill-turn machines; users who machine parts in low volumes and who make frequent program changes, such that time lost to prove-out is unacceptable; companies machining exotic (expensive) materials where the cost of a scrapped part is simply unacceptable; companies that do not use a CAM system or use non-graphical programming methods – family-of-parts or parametric programming systems; those that apply lights-out machining where programs may be loaded in an unmanned environment and so where there is no possibility of prove-out; and those using high-speed machines where it is simply impossible to see what is happening on a real machine.”

The benefits to be gained are in the areas of avoiding lost production time and the repair costs of a collision; reduction or elimination of machine prove-out time; increased shopfloor safety; and improved programmer and operator training since there is a feedback loop from origination of the program to the end-result, the latter informing the former for future programs.

**DATA IN – SIMULATION OUT**

To simulate the process, though, Vericut must first be ‘filled up with data’ in respect of the various elements of the CNC machining process – machine, tools, fixtures, stock model, and so on. Where does this information come from? “From the CAM system; Vericut has an interface to many popular CAM systems, including Unigraphics, Catia, PTC, EdgeCAM, MasterCAM – with more under development,” Mr Reed reveals, adding that stock models, fixtures, tooling, and work co-ordinate systems can be extracted from these CAM systems. Moreover, the
CNC PROGRAM VERIFICATION

The time taken to run a simulation can be minutes or hours, depending on part complexity. But you can ‘minimise’ Vericut and do something else or use the batch mode. For those tempted to miss out the simulation phase when ‘small’ design changes are made, Mr Reed has a word of warning, “don’t, the consequences can be disastrous”.

IMPROVING CAM OUTPUT
Vericut’s optional OptiPath feed rate optimisation facility combats the CNC programmer’s propensity to use a single safe feed rate for each tool and rarely change it except, perhaps, for plunging and side cutting. “In practice it is impossible to calculate and input the optimum feed rate for each tool move as the parameters can change depending on the tool path and conditions under the tool.”

The cycle time savings with OptiPath can be anywhere from 15 to 50 per cent “but rarely less than 20 per cent”. The Vericut user base is broad: large companies – “all the major aerospace companies and their supply chains” automotive companies – “in particular motor sport and F1 teams and engine developers” – companies in power generation, oil and gas, and smaller companies, often suppliers to larger companies who take ‘overflow’ work, find that having Vericut is seen as a benefit by their customers.

And those not yet using Vericut can start small – basic Vericut simulates G codes but does not have full machine simulations, which can be added later. As machines become more complex and the costs of not having them cut metal increase, perhaps the question is, not why simulate, but why not?