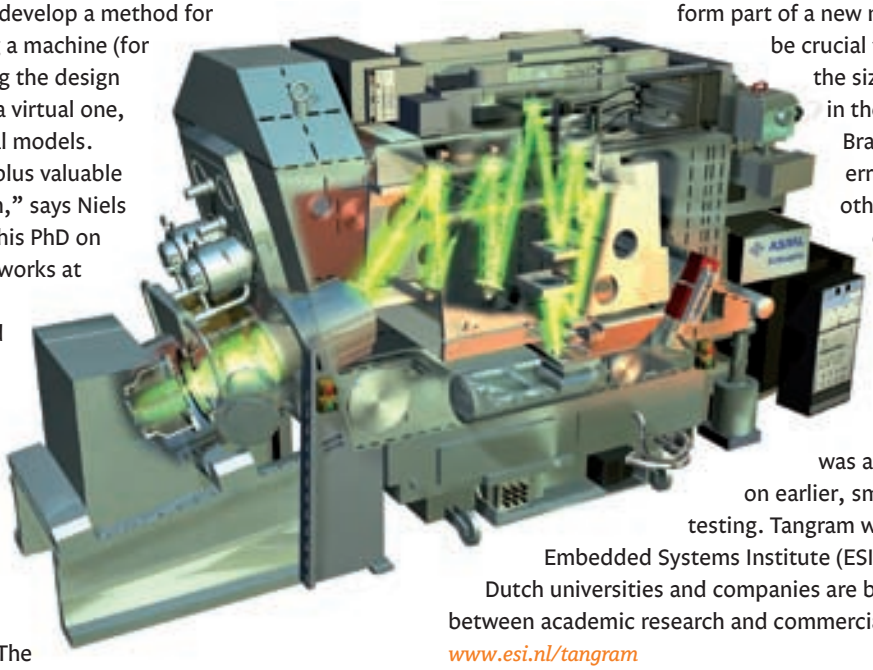
Earlier, smarter, and faster testing

Earlier, smarter and faster testing

In the semiconductor industry, speed is crucial. Whoever is first on the market with a new generation of chips has the edge, which is why manufacturers do all they can to reduce the time to market, and the supply industry is not lagging behind either. In the Netherlands, wafer scanner manufacturer ASML and the Eindhoven University of Technology formed a public-private partnership to develop a method for integrating and testing a machine (for producing chips) during the design phase. The method is a virtual one, based on mathematical models.
"It saves a lot of time plus valuable hours in the cleanroom," says Niels Braspenning, who did his PhD on this research and now works at ASML.
Braspenning converted machine component specifications into formal model-checking tools, which enabled him to check at an early stage whether components worked properly, and whether they combined well. "The system is so complex that problems often only appear during the integration process, and then you have to carry out repairs. Using our mathematical models, we can perform powerful analyses that indicate these sorts of problems much sooner." Braspenning succeeded in testing the communication between an existing tangible light source and a virtual model of a vacuum system, both of which form part of a new machine that will be crucial to further reducing the size of microchips in the years to come.



Braspenning uncovered errors that would otherwise only have emerged many weeks later in the cleanroom.
Braspenning's research is one of the successes of Tangram, which was a project focussing on earlier, smarter and faster testing. Tangram was coordinated at the Embedded Systems Institute (ESI) in Eindhoven, where Dutch universities and companies are bridging the gap between academic research and commercial reality.

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Dikes monitored by sensors

Human beings have monitored the dikes in the Netherlands for five hundred years. Through the centuries, dike inspectors have gathered and passed on knowledge that is invaluable to the safety of a country that lies mostly below sea level. Nonetheless, human labour is expensive and not always reliable. That is why, on a small polder in the northeast of the Netherlands, researchers are working on dike security for the future. Their secret weapon? Sensors. According to senior scientist Nico Pals from research organisation TNO, "Sensors can help inspectors make better decisions."
Up to and including 2013, the researchers will be experimenting in the polder with some of the smaller dikes, fitting them out with sensors for measuring all sorts of changes to the dikes: temperature, seepage speed, distortion, water tension ... the list goes on. The programme already contains twenty experiments. Pals: "We want to gather as much data as possible. What actually happens when a dike bursts? What determines the condition of a dike? And how can we anticipate dangerous situations as early as possible using sensors?
The initiator TNO and a number of government agencies (including district water boards) and several other research institutes are working together in the 'Dike Calibration Foundation' [Stichting IJkdijk]. Around fifty businesses have already registered with the consortium and expressed an interest in providing the technology, from sensor specialists to data processors. Pals: "Knowledge, supply, and demand are therefore coming together. That's unique."
TNO challenges parties to work together to find solutions to parts of an overall problem. Promising solutions will ultimately be bundled together in a comprehensive water management system. "If we can manage that, we'll have made a good export product," says Pals.

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What actually happens when a dike bursts?