4.5 million euros to make complex computer-controlled systems more robust

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The aim of the international project, ADMORPH, is to make various types of complex systems that are controlled by computers more resistant to defects and more secure. The new consortium has received a grant of 4.5 million euros from the EU Horizon2020 programme. ADMORPH is an international European project led by the University of Amsterdam.

The ADMORPH team.

The world around us is increasingly monitored and controlled by computers. Smart algorithms control all sorts of factory processes and entire distribution chains, vehicles like cars and airplanes can now drive or fly without a human driver, and with the most modern surveillance systems it is no longer necessary that a person in a box keeps an eye on the monitors all night.

Safety

In technical terms this phenomenon in which physical systems in daily live are controlled via computer technologies are called Cyber Physical Systems (CPS). For CPS systems to function properly, it is very important that they are resistant to hardware defects and are safe; and the more complex the system, the greater the challenge. Many CPS systems have applications where reliability is very important. Think of the autonomous cars and airplanes. The systems also sometimes operate in harsh outdoor conditions, so they must therefore be able to deal with system components that become abruptly defective. And of course all systems must be well protected against hackers. Otherwise you run the risk that the factory processes and distribution chains will stop, vehicles will get into accidents and the surveillance systems will no longer pick up suspicious situations.

European collaboration

Making complex CPS systems more robust and secure is the goal of the newly started ADMORPH consortium. ADMORPH is an international European project led by the University of Amsterdam (UvA). The other partners are Thales Nederland, SYSGO S.A.S. from France, the University of Luxembourg, Lund University from Sweden, the United Technologies Research Center Ireland, the Czech Q-media, the Faculty of Sciences of the University of Lisbon from Portugal and the University of Augsburg from Germany. The acronym ADMORPH stands for Adaptive, dynamically morphing, mission and safety-critical CPS; as the name suggests, the parties involved have devised a strategy to make the systems more robust and secure by making them more adaptive and flexible.

Applications

For this, the consortium receives a subsidy of no less than 4.5 million euros from the European Horizon2020 program. About 1 million of this goes to the University of Amsterdam. The project mustbe ready in three years. The idea is that by then the team has not only worked out a set of practical solutions, but has also applied those solutions to a number of existing systems. These real-world applications the project focuses on are a complex system that controls autonomous aircrafts, a system that provides real-time radar surveillance and a system that monitors and manages a metro network.

"With the increasing importance of complex CPS systems in society, the importance of the stability of these systems is also increasing," says project leader Dr. Andy Pimentel of the UvA. “We are very grateful to the EU for this grant, that has made it possible to bring together the expertise and knowledge from many countries. With ADMORPH we hope to contribute to a society in which CPS systems make our lives easier, while we can also trust these systems to be highly safe and reliable. ”

Go to the ADMORPH website