

AMSD: A Dependability Roadmap for the Information Society in Europe

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System Dependability is the greatest challenge facing us before we can realise the potential of the Information Society in the 21st century. Unless we can build systems that we can trust to behave as we intended them to, we cannot risk creating a society where our economic well-being, our quality of life, our safety and our security depend on the correct and continuous interactions of millions of computer-based systems.

Someone will object that we are already dependent on such systems—for example, to control aircraft, factories, and nuclear reactors—and he would be right. But there are two factors that mean that we cannot base our future strategy on past successes.

Firstly, current systems that must not fail are relatively few, and are developed at a cost in time and money that would be unacceptable for the great majority of applications. So we must find ways to achieve high levels of dependability without high costs.

Secondly, current systems are far less interconnected and interdependent than we plan them to be in the future, and their large majority is operated by trained users. Our target, therefore, is to be able to build highly dependable systems, at much lower costs than at present, and to be able to do so predictably, without overruns in costs or time, and with a focus on usability properties. In a phrase: *dependable projects that deliver dependable and usable systems, cost-effectively.*

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The AMSD Dependability Roadmap for the Information Society in Europe provides an up-to-date guide to the issues relating to system dependability and the research results and future directions that address these issues. There are reasons to believe that Europe could produce a practical engineering solution to the challenge of system dependability within 10 years. This would enable European industry:

- to develop systems to support the ISTAG scenarios with guaranteed dependability;
- to deliver major e-Government and e-Commerce systems profitably, on time and within budgets;
- to offer warranties against failure of all software products, at no additional charge and without commercial risk;
- to win a substantial share of the world market for software products using the new smart-card and embedded system architectures.

Information Society in Europe offers a valuable opportunity to build on the strong science and technology that already exists in European companies and universities, so that these objectives can be realized within a decade. We have the opportunity to transform software development into a true engineering discipline, using strong science and mature development processes and built on the foundations of the lasting insights of the past fifty years.

To achieve the goal of dependable projects that deliver dependable and usable systems, cost-effectively will require research and technology development. The AMSD Roadmap has identified the areas where research and development would be most needed and beneficial in the coming years. I hope the Roadmap will guide and support the whole spectrum of Information Society Technologies, so that we can maximize the progress towards solving the outstanding problems of software dependability, and eliminate the waste, delay and frustration caused by poor quality software worldwide.

AMSD is the result of a collective effort by the many people involved in the workshop discussions, in the other roadmap projects and in particular by the people who contributed to the final version, which can be found at <http://www.am-sd.org>.

Among them: Brian Randell, University of Newcastle upon Tyne, Robin Bloomfield, Adelard, George Cleland, Adelard, Meine Van der Meulen, Adelard, Erik Bohlin, Chalmers University of Technology, Erwin Schoitsch, ARC Seibersdorf Research, Mieke Massink, ISTI-CNR, Pisa, Bev Littlewood, City University London, Cliff Jones, University of Newcastle upon Tyne, Marc Wilikens, JRC, Pravir Chawdhry, JRC, Matina Halkia, JRC, Neil Mitchison, JRC, Marcelo Masera, JRC.