New Paradigms for Space Science Data Collection

Mike Hinchey

NASA Goddard Space Flight Center and Loyola College in Maryland

NASA is examining the use of new technologies for untended space science data collection. Future concepts include the use of multiple satellites flying in formation to collect real-time data, and the use of autonomous vehicles and spacecraft flying as swarms over planetary surfaces. Moreover, new paradigms of exploration will be employed to enable science data to be collected from regions of space where heretofore it was impossible to send spacecraft and where it is impossible to send manned exploration mission. Longevity and survivability of the mission relies on the autonomous and self-sustaining nature of the mission, with a need for timely decisions to be taken in situ rather than back on Earth (due to the long communication delays) fusing information and requirements from multiple (up to 1000) spacecraft to ensure the preservation of the mission.

Mike Hinchey is Professor of Computer Science and Director of the Graduate Program at Loyola College, Baltimore, MD, USA. Until January 2007, he held a US Congressional appointment as Director of the NASA Software Engineering Laboratory, located at NASA Goddard Space Flight Center in Greenbelt, MD. He continues to act as a NASA Expert Consultant. Prior to joining the US government, at various times he held positions at the level of full professor in the US, Australia, Sweden, Ireland and the UK. He received a B.Sc. in Computer Science from University of Limerick, Ireland, an M.Sc. in Computation from University of Oxford, UK, and a Ph.D. in Computer Science from University of Cambridge, UK. He is Chair of the IEEE Technical Committee on Complexity in Computing, Vice Chair of the IEEE Task Force on Autonomous and Autonomic Systems, and is the IEEE Computer Society's representative to IFIP Technical Committee 1 (Foundations of Computer Science), which he currently chairs.